5-4930-206-15

TM 5-4930-206-15

DEPARTMENT OF THE ARMY TECHNICAL MANUAL

ORGANIZATIONAL, DS, GS,
AND DEPOT MAINTENANCE MANUAL

LUBRICATING AND SERVICING UNIT

TRAILER MOUNTED; 16 CFM COMPRESSOR
GASOLINE DRIVEN
(GRAY COMPANY, INC. MODEL 251-437)
FSN 4930-892-5067

This reprint includes all changes in
effect at the time of publication -
Changes 1 through 3.

HEADQUARTERS, DEPARTMENT OF THE ARMY
FEBRUARY 1965

TAGO 7065-A—March

READEX FICHE best copy available

D 101.11:

SAFETY PRECAUTIONS

Before Operation

When handling fuel do not smoke. Always provide a metal to metal contact between container and tank. This will prevent a spark from being generated as fuel flows over the metallic surfaces.

When servicing batteries, avoid contact with electrolyte as it contains acid which can cause severe burns. Should the electrolyte come in contact with the body or clothing, rinse immediately with clear water.

When servicing batteries, do not smoke or use an open flame in the vicinity. Batteries generate hydrogen, a highly explosive gas.

When inflating a tire, remain to one side of the tire rather than directly in front of it. Serious injury may result if a tire blows out or rim is forced off.

Keep a fully charged fire extinguisher in good working order, mounted in bracket and ready for use.

Disconnect the engine ignition cable at the sparkplugs before servicing the compressor.

During Operation

Do not fill gasoline tank while the engine is in operation.

Do not operate engine with any part of the air shroud removed.

Do not operate the engine in an inclosed area unless the exhaust is piped to an open area. The exhaust contains carbon monoxide, a colorless, odorless, deadly poisonous gas.

Do not attempt any repairs or replacement of parts while equipment is in operation.

When lubricating, stop all operation of equipment being serviced.

After Operation

When handling fuel do not smoke. Always provide a metal to metal contact between container and tank. This will prevent a spark from being generated as fuel flows over the metallic surfaces.

Do not attempt any repair or adjustment to engine until cooled. A hot engine may cause severe burns.

Use only approved solvents for cleaning purposes. Never use gasoline.

Before disassembly of the equipment, relieve all pressure in tank and compressor.

TM 5-4930-206-15
C 1

CHANGE
No. 1

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, D.C., *19 August 1970*

Organizational, DS, GS, and Depot Maintenance Manual

LUBRICATING AND SERVICING UNIT: TRAILER MOUNTED; 16 CFM COMPRESSOR; GASOLINE DRIVEN (GRAY COMPANY, INC. MODEL 251-437) FSN 4930-892-5067

TM 5-4930-206-15, 24 February 1965, is changed as follows:

Page 3, paragraph 1*c*. The mailing address is changed to read as follows: "Commanding General, U.S. Army Mobility Equipment Command, ATTN: AMSME-MPP, 4300 Goodfellow Boulevard, St. Louis, Mo. 63120.

Page 67. Paragraph 163, after line 10 add the following: TM 750-244-3 contains procedures for destruction to prevent enemy use.

Page 69. Paragraph 170*a*, in the last sentence reference "AR 743-505" is changed to read "TM 740-90-1."

Page 70. Paragraph 172*b* is rescinded.

Page 77. Figure 39.1 is added as follows:

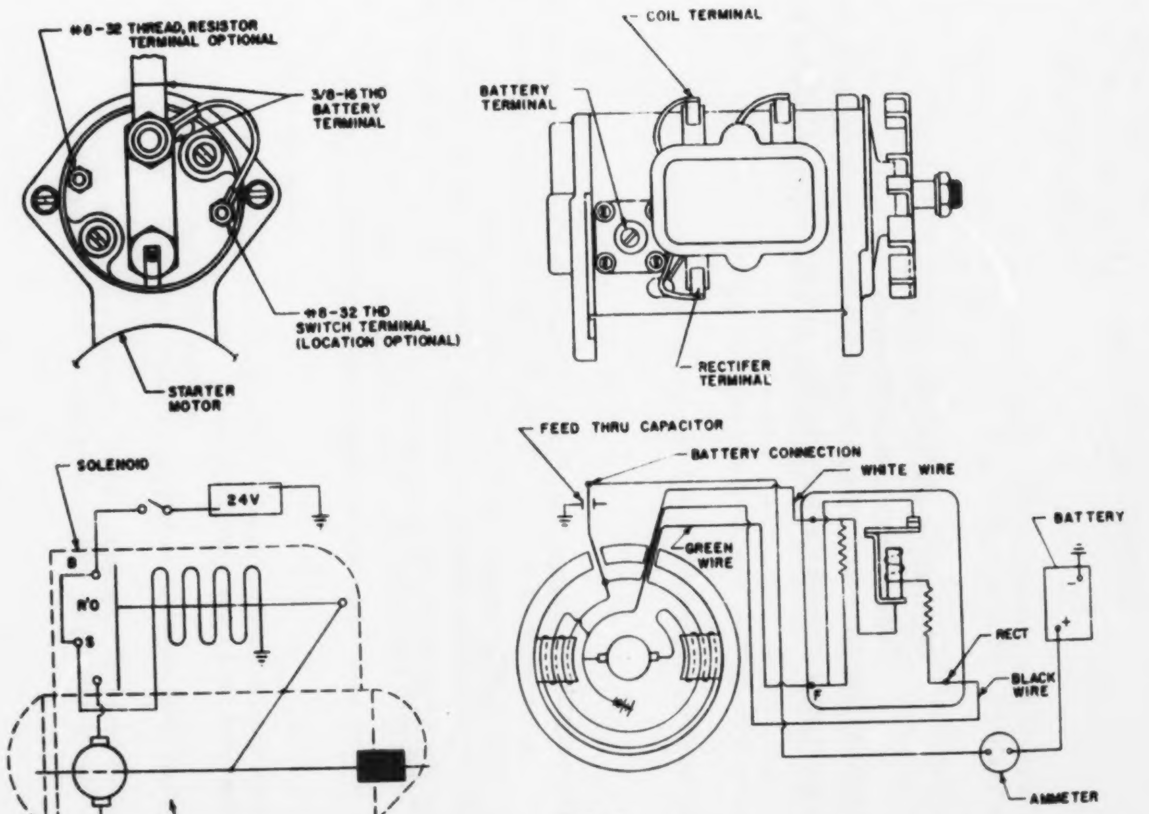
#8-32 THREAD, RESISTOR TERMINAL OPTIONAL
3/8-16 THD BATTERY TERMINAL
#8-32 THD SWITCH TERMINAL (LOCATION OPTIONAL)
STARTER MOTOR
COIL TERMINAL
BATTERY TERMINAL
RECTIFER TERMINAL
SOLENOID
24V
B
R/O
S
STARTER MOTOR
FEED THRU CAPACITOR
BATTERY CONNECTION
WHITE WIRE
GREEN WIRE
BATTERY
RECT
BLACK WIRE
F
AMMETER

FIGURE 22
MILITARY STANDARD GENERATOR (8AMPERE, 24 VOLT) AND ELECTRIC STARTER WIRING DIAGRAM

13213E3917 A

Page 112, column G, lines 12 and 15. Change DS to read 0.

Page 114, column G, lines 19, 24, and 25. Change DS to read 0.

Page 119. Item 12. TM 5-2805-203-14P is changed to read TM 5-2805-203-24P.

Item 13, TM 5-2805-203-50 and item 14, TM 5-2805-203-50P are rescinded.

By Order of the Secretary of the Army:

W. C. WESTMORELAND,
General, United States Army,
Chief of Staff.

Official:
KENNETH G. WICKHAM,
Major General, United States Army,
The Adjutant General.

Distribution:

To be distributed in accordance with DA Form 12-25, Sec I (qty rqr Block #137), Operator requirements for Equipment, Lubricating and Servicing.

Figure 39.1. Military standard generator (5 ampere, 24 volt) and electric starter wiring diagram.

CHANGE }
No. 1 }

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, D.C., *19 August 1970*

Organizational, DS, GS, and Depot Maintenance Manual
LUBRICATING AND SERVICING UNIT: TRAILER MOUNTED; 16 CFM COMPRESSOR; GASOLINE DRIVEN (GRAY COMPANY, INC. MODEL 251-437) FSN 4930-892-5067

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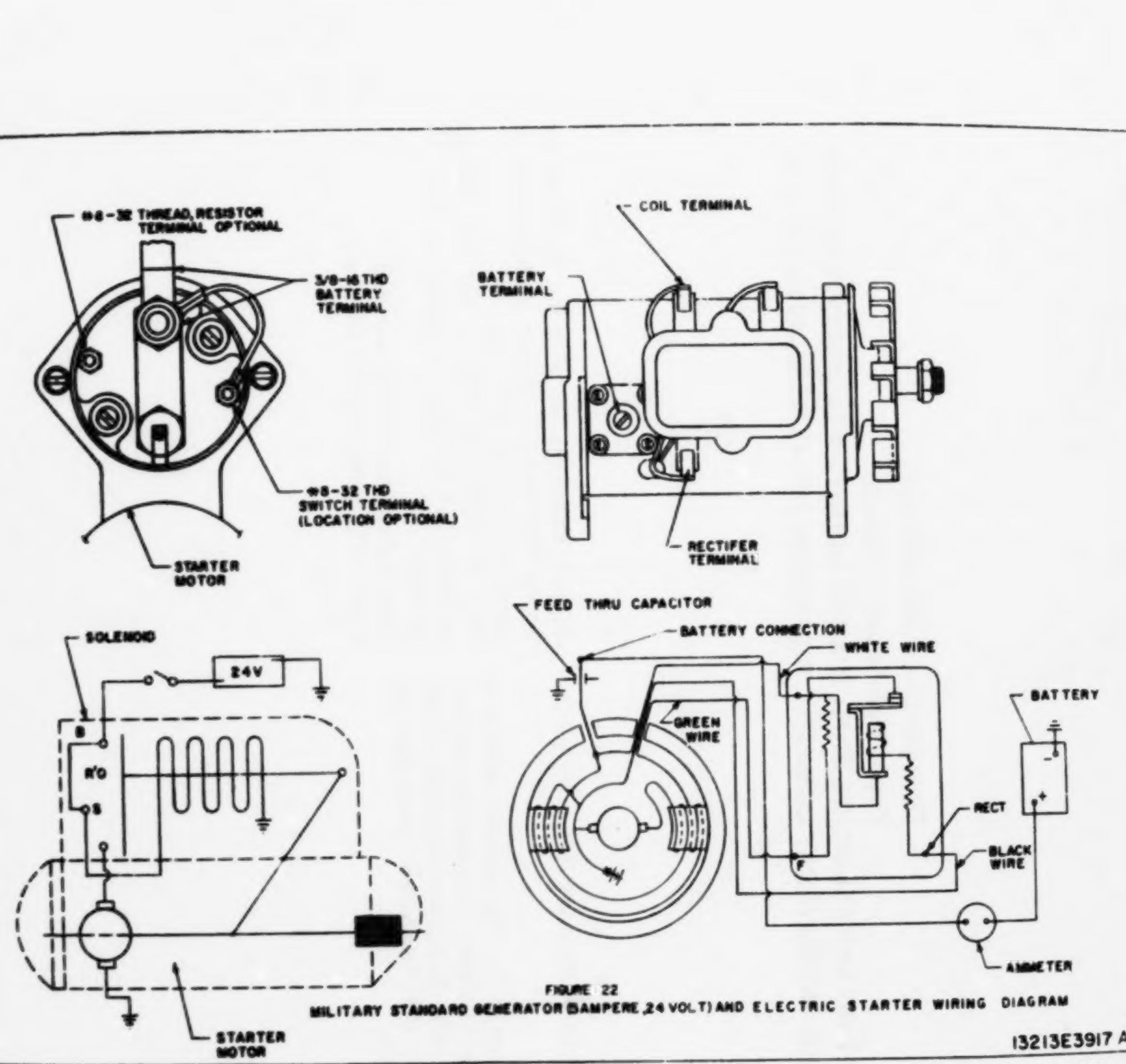
Page 77. Figure 39.1 is added as follows:


#8-32 THREAD, RESISTOR TERMINAL OPTIONAL
3/8-16 THD BATTERY TERMINAL
#8-32 THD SWITCH TERMINAL (LOCATION OPTIONAL)
STARTER MOTOR
COIL TERMINAL
BATTERY TERMINAL
RECTIFER TERMINAL
SOLENOID
24V
B
R/O
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STARTER MOTOR
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GREEN WIRE
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Figure 39.1. Military standard generator (5 ampere, 24 volt) and electric starter wiring diagram.

Changes in Force C 1 and C 2

TM 5-4930-206-15
C 2

CHANGE
NO. 2

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., *20 July, 1973*

Organizational, Direct Support, and General Support and Depot Maintenance Manual
LUBRICATING AND SERVICING UNIT
TRAILER MOUNTED: 16 CFM COMPRESSOR GASOLINE DRIVEN
(GRAY COMPANY, INC. MODEL 251-437)
FSN 4930-892-5067

TM 5-4930-206-15, 24 February 1965 is changed as follows:
Page 117, Appendix III, Basic Issue Items List is rescinded.

By Order of the Secretary of the Army:

CREIGHTON W. ABRAMS
General, United States Army
Chief of Staff

Official:

VERNE L. BOWERS
Major General, United States Army
The Adjutant General

Distribution:

To be distributed in accordance with DA Form 12-25A, (qty rqr block No. 137) operator maintenance requirements for Lubricating and Servicing Equipment.

TM 5-4930-206-15
C 2

CHANGE
NO. 2

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., *20 July, 1973*

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LUBRICATING AND SERVICING UNIT
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The Adjutant General

Distribution:

To be distributed in accordance with DA Form 12-25A, (qty rqr block No. 137) operator maintenance requirements for Lubricating and Servicing Equipment.

Changes in force: C 1, C 2, and C 3

TM 5-4930-206-15
C3

Change No. 3

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, D. C. *15 July 1974*

Operator's, Organizational, Direct Support and General Support, and Depot Maintenance Manual

LUBRICATING AND SERVICING UNIT; POWER OPERATED; TRAILER-MOUNTED; LUBRICANT STORAGE TANK, 3-COMPARTMENTS; 16-CFM COMPRESSOR; GASOLINE-ENGINE DRIVEN (GRAY COMPANY, INC. MODEL 251-437) FSN 4930-892-5067

TM 5-4930-206-15, 24 February 1965, is changed as follows:

Title nomenclature is changed as shown above.
Reverse of Cover. Add to Safety Precautions:

WARNING

Operation of this equipment presents a NOISE HAZARD to personnel in the area. The noise level exceeds the allowable limits for unprotected personnel. Wear ear muffs or ear plugs which were fitted by a trained professional.

WARNING

Cleaning solvent, PD-680, is POTENTIALLY DANGEROUS CHEMICAL. Do not use near open flame.
Page 3, paragraph 1*c*. Line 8 is changed to Commander, US Army Troop Support Command, ATTN: AMSTS-MPP, 4300 Goodfellow Boulevard, St. Louis, MO 63120.
Page 9, paragraph 10, add: Noise hazard warning signs conforming to AR 385-30 will be erected in the area to provide notification of NOISE HAZARD in accordance with TB MED-251. The signs should read:

WARNING

NOISE HAZARD EQUIPMENT HEARING PROTECTION REQUIRED
Page 14, paragraph 41, add:

WARNING

Operation of this equipment presents a NOISE HAZARD to personnel in the area. Wear ear muffs or ear plugs which were fitted by a trained professional.
Page 23, paragraph 62*c*, add:

WARNING

Dry cleaning solvent, PD-680, used for cleaning is a POTENTIALLY DANGEROUS CHEMICAL. Do not use near open flame. Flash point of solvent is 100F - 138F.

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CREIGHTON W. ABRAMS
General, United States Army
Chief of Staff

Official:

VERNE L. BOWERS
Major General, United States Army
The Adjutant General

Distribution:

To be distributed in accordance with DA Form 12-25A, (qty rqr block No. 187) Operator maintenance requirements for Lubricating and Servicing.

Changes in force: C 1, C 2, and C 3

TM 5-4930-206-15
C3

Change }
No. 3 }

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, D. C. *15 July 1974*

Operator's, Organizational, Direct Support and General Support, and Depot Maintenance Manual

LUBRICATING AND SERVICING UNIT; POWER OPERATED; TRAILER-MOUNTED; LUBRICANT STORAGE TANK, 3-COMPARTMENTS; 15-CFM COMPRESSOR; GASOLINE-ENGINE DRIVEN (GRAY COMPANY, INC. MODEL 251-437) FSN 4930-892-5067

TM 5-4930-206-15, 24 February 1965, is changed as follows:

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TECHNICAL MANUAL
No. 5-4930-206-15

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., *24 February 1965*

ORGANIZATIONAL, DS, GS, AND DEPOT MAINTENANCE MANUAL

LUBRICATING AND SERVICING UNIT: TRAILER MOUNTED; 16 CFM COMPRESSOR; GASOLINE DRIVEN (GRAY COMPANY, INC. MODEL 251-437)

FSN 4930-892-5067

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CHAPTER 1
INTRODUCTION

Section I. GENERAL

1. Scope

a. These instructions are published for the use of the personnel to whom the Gray Model 251–437 Lubricating and Servicing Unit is issued. Chapters 1 through 4 provide information on the operation, preventive maintenance services, and organizational maintenance of the equipment, accessories, components and attachments. Chapters 5 through 10 provide information for direct and general support and depot maintenance. Also included are descriptions of main units and their functions in relationship to other components.

b. Appendix I contains a list of publications applicable to this manual. Appendix II contains the maintenance allocation chart. Appendix III contains the list of basic issue items authorized the operator of this equipment and the list of maintenance and operating supplies required for initial operation. The Organizational, Direct and General Support, and Depot Maintenance Repair Parts and Special Tools are listed in TM 5–4930–206–25P.

c. The direct reporting by the individual user, of errors, omissions, and recommendations for improving this manual is authorized and encouraged. DA Form 2028 (Recommended Changes to DA Publications) will be used for reporting these improvements. This form will be completed in triplicate using pencil, pen, or typewriter, and forwarded direct to: Commanding Officer, U.S. Army Mobility Equipment Center, ATTN: SMOME-MMP, Post Office Drawer 58, St. Louis, Missouri 63166.

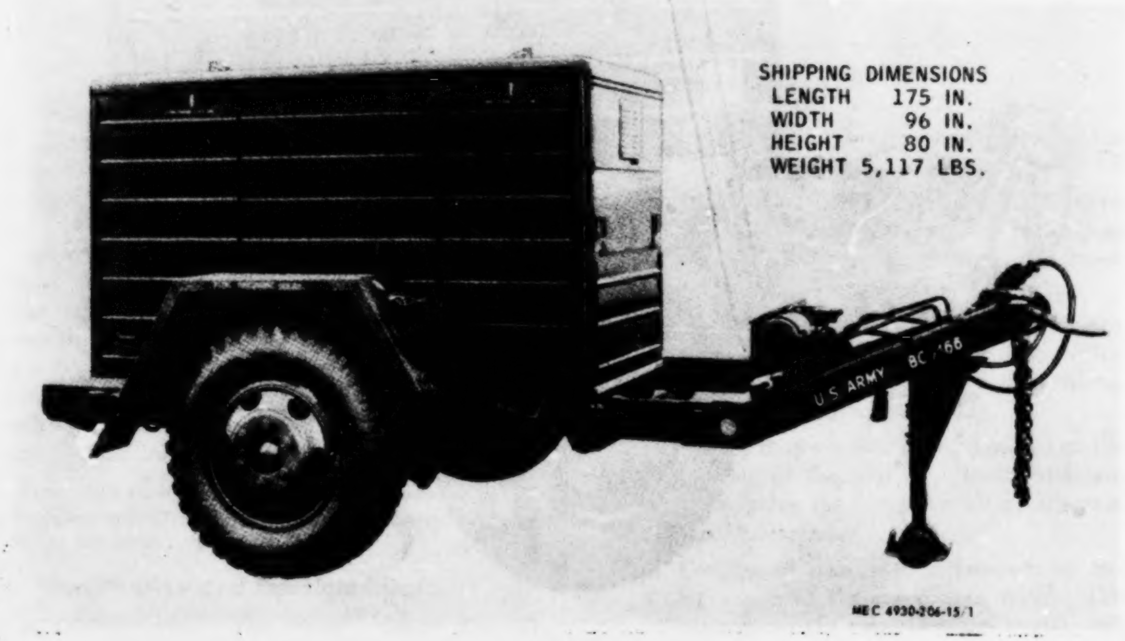


Figure 1. Lubricating unit, front three-quarter view with shipping dimensions.

d. Report all equipment improvement recommendations as prescribed by TM 38–750.

2. Record and Report Forms

a. DA Form 2258 (Depreservation Guide of Engineer Equipment).

b. For other record and report forms applicable to operator, crew and organizational maintenance refer to TM 38–750.

Note. Applicable forms, excluding standard Form 46, which is carried by the operator, shall be kept in a canvas bag mounted on the equipment.

Section II. DESCRIPTION AND DATA

3. Description

The Gray Model 251–437 Lubricating and Servicing Unit (figs. 1 and 2) is a self-contained, gasoline-powered unit equipped for heavy-duty servicing. Compressed air forces lubricant and motor oil from storage tanks through reel-mounted hoses to the part to be lubricated. Engine oil, lubricant, and grease are stored in three steel containers. In freezing temperatures, exhaust gas, ducted into a heat reservoir beneath the containers, warms the lubricants so they will flow easily. The air alcohol dispenser prevents condensation in the air lines from freezing. Each lubricant container has an air-powered pump. The air pressure and speed of each pump is controlled by separate air pressure regulators; and a pressure gage, attached to each regulator, registers air pressure. A four-cylinder, four-cycle, air-cooled engine powers the air compressor. Two 12-volt batteries, connected in series, supply power to the starter. The engine can also be started with a rope if the starter fails. The piston-type air compressor delivers 15 cubic feet of air per minute at 175 psig. An automatic pressure control stops the compressor from pumping when the air tank pressure reaches 175 psi, and starts the compressor pumping when the pressure drops to 140 psi. A hose reel

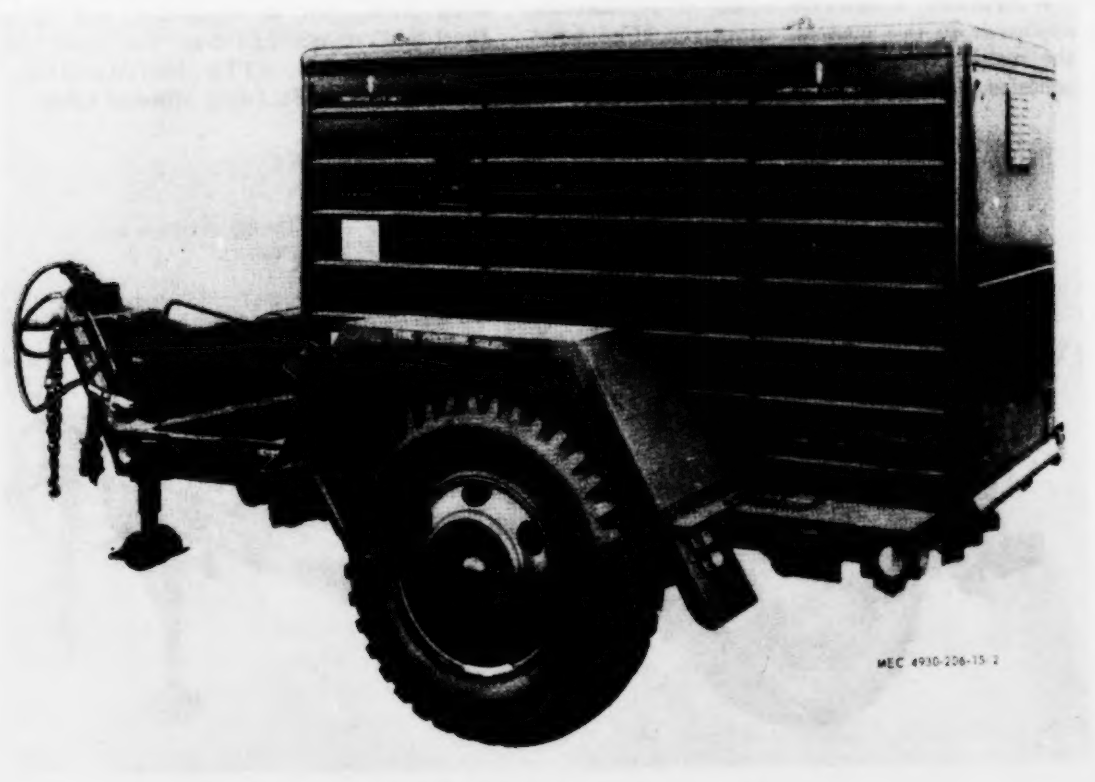


Figure 2. Lubricating unit, left rear three-quarter view.

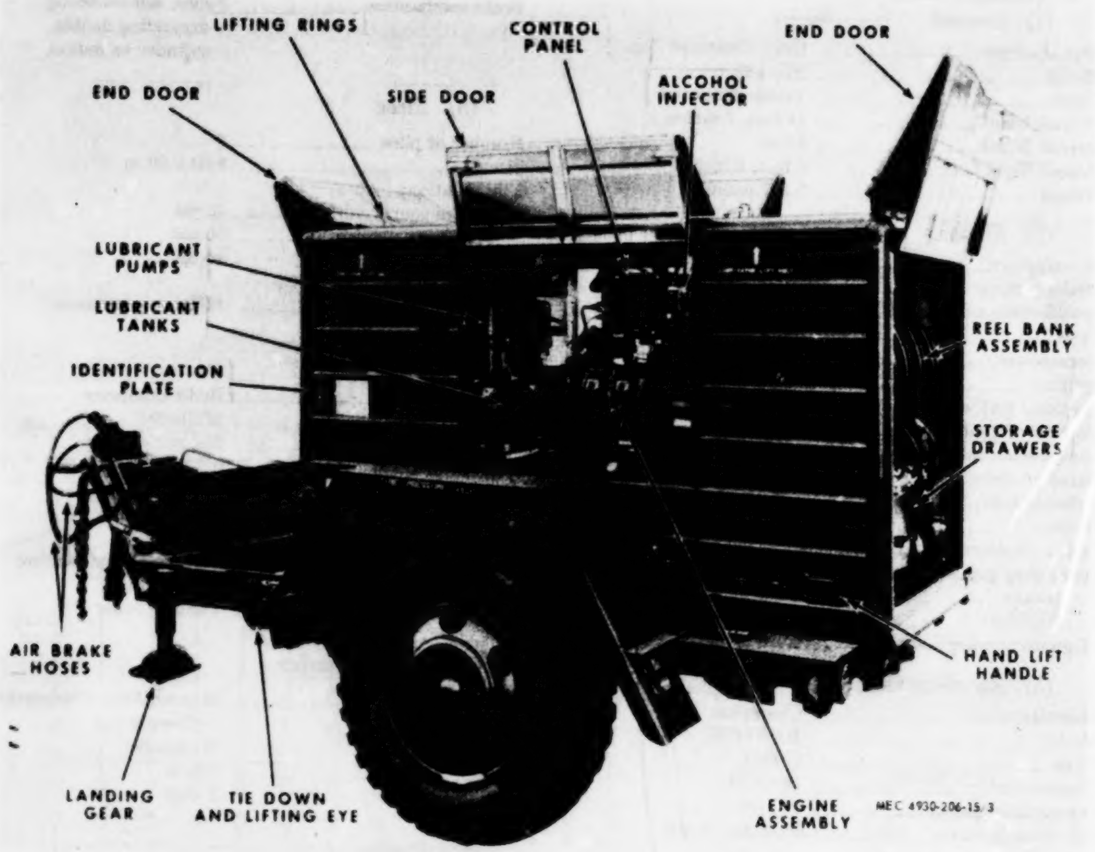

LIFTING RINGS
CONTROL PANEL
END DOOR
END DOOR
SIDE DOOR
ALCOHOL INJECTOR
LUBRICANT PUMPS
LUBRICANT TANKS
IDENTIFICATION PLATE
REEL BANK ASSEMBLY
STORAGE DRAWERS
HAND LIFT HANDLE
AIR BRAKE HOSES
LANDING GEAR
TIE DOWN AND LIFTING EYE
ENGINE ASSEMBLY
MEC 4930-206-15/3

Figure 3. Lubricating unit, left three-quarter view—open.

bank, consisting of five hand-operated reels, is mounted at the rear of the lubricator, together with necessary fittings, control valves, and meters. Four hoses deliver lubricant, and one hose delivers compressed air. Accessory drawers located directly below the reel bank, contain handguns, pneumatic guns, oilers, adapters, and grease fittings. For portability, the Model 251-437 lubricator is mounted on a 2½ ton trailer. An aluminum housing protects the units under all climatic conditions. A door on each side of the housing gives easy access to all parts controls, and the lubricant storage compartments.

Note. The terms used to describe locations on the unit refer to the reel end as the "rear," the engine side as the "left," and the compressor side as the "right."

4. Identification and Tabulated Data

a. Identification. The Gray Model 251-437 Lubricating and Servicing Unit has four major identification plates. Information regarding the plates is listed below.

(1) *Corps of Engineers data plate.* Located on the enclosure assembly. The plate gives description, serial number, manufacturer, model and dimensions.

(2) *Transportation data plate.* Located on the exterior of the unit. The plate gives the pintle load, center of gravity dimensions, and other transportation data.

(3) *Wiring diagram data plate.* Located on the interior of the unit, the wiring diagram plate gives the complete wiring diagram for the lubricator.

(4) *Compressor data plate.* Located on the right side of the compressor body. The plate gives the manufacturer, model, and serial number.

b. Tabulated Data.

(1) *General.*

Manufacturer	Gray Company, Inc.
Model	251–437
Type	Trailer Mounted
Overall Length	14 feet, 7 inches
Overall Width	8 feet
Overall Height	6 feet, 8 inches
Weight	5,117 pounds

(2) *Engine.*

Manufacturer	Continental
Model number	4A032–1
Specification number	MIL–E–11275
Type	Industrial (air cooled)
Horsepower	6
Ignition	Magneto
Cranking method	Electric starter-manual
Number of cylinders	4
Compression ratio	6.2:1
Rated governed speed	3500 RPM
Cylinder bore	2.25
Stroke	2.00
Piston displacement	31.80 cu. in.
Spark plug gap	.025 in.
Intake	0.014
Exhaust	0.014
Magneto breaker point gap	0.018

(3) *Air compressor.*

Manufacturer	Champion
Model	REN14HU
Type	COML
Displacement	16 CFM
Crankcase capacity	2½ Qt
Operating pressure	Free Air 15 cfm
Rated discharge pressure	175 psig

(4) *Lubricant pumps.*

Manufacturer	Gray Company, Inc.
Type:	
General purpose grease pump.	46 to 1 high pressure
Gear oil pump	11 to 1 low pressure
Engine oil pump	11 to 1 low pressure
Operating pressure	20 to 200 psi

(5) *Alcohol dispenser.*

Manufacturer	Norgren Company
Type	Reversible
Model	10002118

(6) *Trailer.*

Manufacturer	Littleford Brothers
Type	2½ ton, trailing arm
Model	251320
Serial number range	1 through 85

(7) *Service brakes.*

Manufacturer	Wagner Electric Company
Type	Air actuated hydraulic
Operating air pressure	60 psi min.
Diameter	16.0705 in.
Width	3 in.
Brake mechanism	2 shoe, self-centering, expanding double cylinder actuation.

(8) *Tires.*

Number of plies	8
Size	9.00 x 20 in.
Tire inflation:	
Cross country driving	45 psi
Highway driving	50 psi
Mud, snow and sand driving.	40 psi
Type	Military pneumatic

(9) *Wheels.*

Manufacturer	Budd Company
Type	Military
Diameter of stud circle	8¾ in.
Number of studs	6
Rim size	7.5 x 20 in.
Tire retention	Split side ring
Wheel bearings:	
Manufacturer	Timken Roller Bearing Company.
Type	Tapered roller

(10) *Shock absorber.*

Manufacturer	Monroe Auto Equipment Company.
Type	Hydraulic
Bore	1⅜ in.
Action	2 way

(11) *Lights.*

Manufacturer	Guide Lamp Division of General Motors Corp.
Voltage	24 Volts-dc

(12) *Capacities.*

Fuel tank	10 gal.
Engine crankcase	2⅛ qt.
Compressor crankcase	3 qt.
Lubricant Storage Bins:	
General purpose grease	23 gal.
Gear oil	27 gal.
Engine oil	27 gal.

(13) *Practical wiring diagram.* Refer to figure 4, as an aid in understanding the electrical system of the lubricating and servicing unit.

5. Difference in Models

This manual covers only the Gray Lubricating and Servicing Unit, Model 251–437, serial numbers 10547 through 10632.

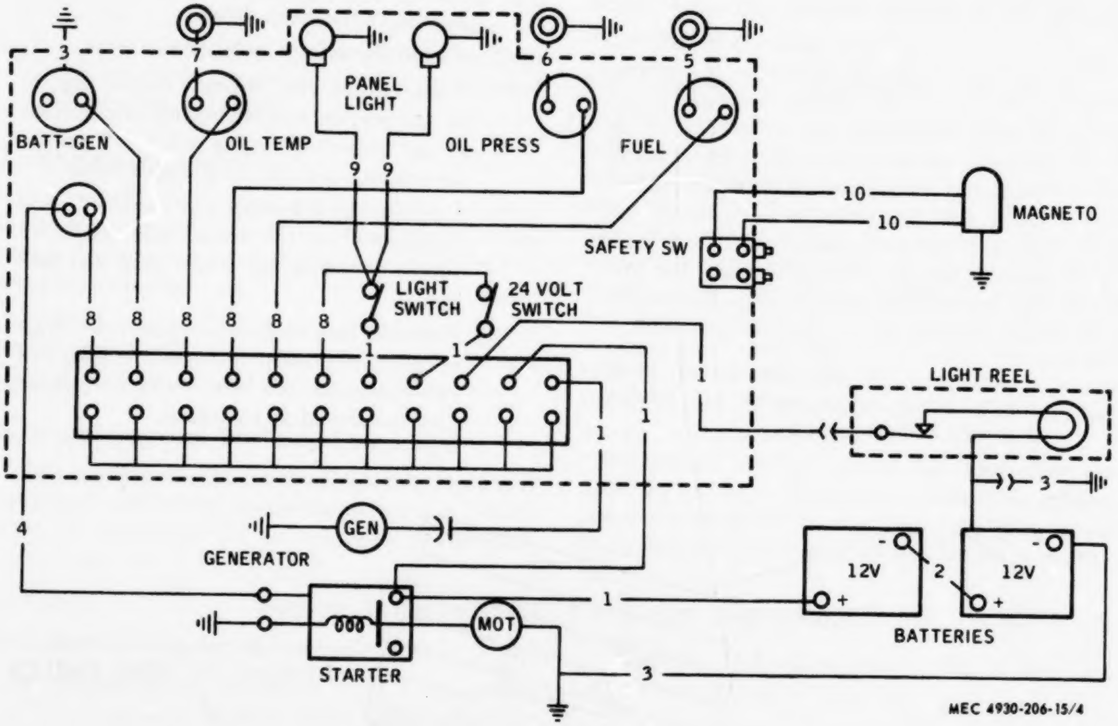

3
7
6
5
PANEL LIGHT
BATT-GEN
OIL TEMP
OIL PRESS
FUEL
9
9
10
10
MAGNETO
SAFETY SW
LIGHT SWITCH
24 VOLT SWITCH
8
8
8
8
8
8
1
1
1
1
1
LIGHT REEL
3
4
GEN
GENERATOR
12V
12V
2
BATTERIES
1
STARTER
MOT
3
MEC 4930-206-15/4

Figure 4. Wiring diagram.

CHAPTER 2

INSTALLATION AND OPERATING INSTRUCTIONS

Section I. SERVICE UPON RECEIPT OF EQUIPMENT

6. Unloading Equipment

a. Unloading by Ramp.

(1) To unload the unit, remove blocking and tie-down cables. See figure 5. If a permanent ramp is not available, construct a temporary ramp from the carrier bed to the ground. Make certain the ramp is strong enough to support the weight of the lubrication unit. Make the incline gradual, and support the ramp planks with blocking to prevent sagging or side-slipping. For towing the lubrication unit from the carrier, use a 2½ ton 6 x 6 truck, or equivalent.

Caution: **Be sure the trailer brake system works before towing the lubrication unit from the carrier.**

(2) Back the truck up to the trailer, align the lunette with the truck hitch, and engage the lunette to the truck hitch.

(3) Fasten the safety chains to the truck.

(4) Connect the two airbrake hoses (fig. 3) to the service and emergency connections on the trailer and towing vehicle. Open the air cutout cocks on the towing vehicle.

(5) Connect the intervehicular cable into the receptacles on the trailer and truck, to supply power to the trailer stop and taillights.

(6) Raise the jack to its travel position. After releasing the trailer and truck brakes, tow the lubrication unit from the carrier, taking care in descending the ramp.

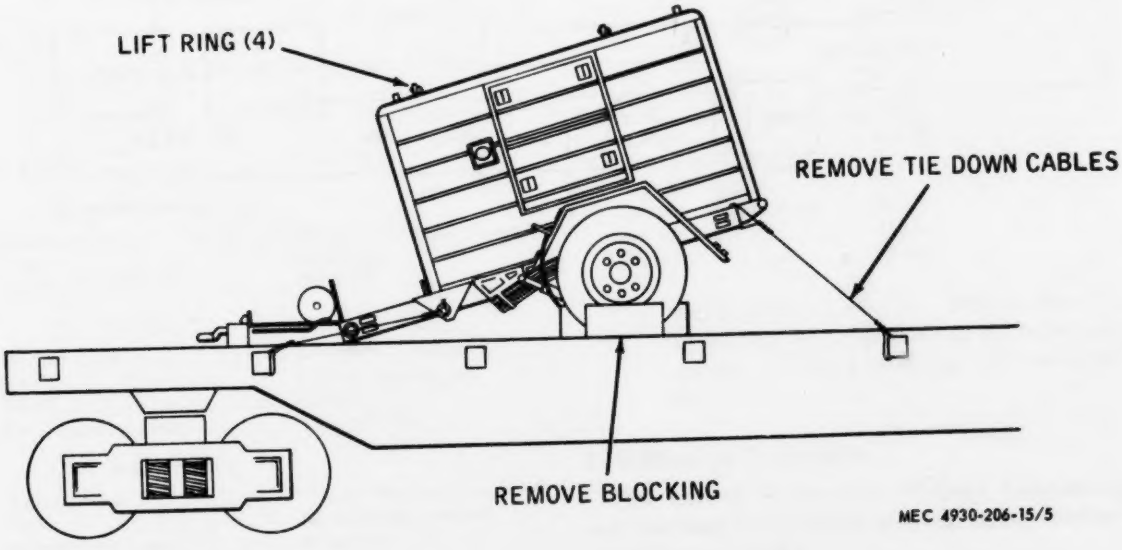


Figure 5. Unloading instructions.

b. Unloading by Crane.

(1) If it is necessary, or more advisable, to unload the equipment by crane, it is the responsibility of the operator or crew to see that the operation is performed correctly and that all safety precautions are observed.

Caution: **Be sure that the crane used has a lifting capacity of at least 3 tons.**

(2) Move the crane into position until the boom hook is over the center of the trailer.

(3) Attach the sling assembly to the trailer and crane boom hook. Refer to figure 5, unloading instructions and attach sling at tiedown areas indicated. Take up slack in sling assembly.

(4) Lift the unit a few inches off the carrier and check for balance. If the unit is balanced properly, swing it from the carrier and lower it to the ground. Lower the jack and remove the slings.

7. Unpacking Equipment

a. General. New units are processed to meet military specifications and are shipped fully assembled. Do not open the equipment unless it is to be put into immediate use.

b. Depreservation. Prepare the lubricating and servicing unit for operation as outlined on DA Form 2258 attached on or near the operator's controls.

8. Inspecting and Servicing Equipment

This paragraph contains an illustrated tabulated listing of preventive maintenance services which must be performed by the operator. The item numbers are listed consecutively and indicate the sequence of minimum requirements. Refer to figure 15 for the daily preventive maintenance services.

9. Installation of Separately Packed Components

The batteries for the unit may be shipped dry-charged. The electrolyte for filling the battery cells is shipped in separate containers. Fill the batteries with electrolyte until the level is one-fourth inch below the filler holes. When the batteries are filled, place them in the battery box and connect the batteries. Use the negative battery terminal for ground connection.

Warning: **Clean up any spilled electrolyte with water. Keep the electrolyte off the skin to prevent personal injury.**

10. Installation or Setting up Instructions

The lubricating and servicing unit is a self-contained unit and requires no special installation. A removable aluminum housing furnishes a protective cover for the unit. Locate the unit where it will receive a supply of clean, dry air. Air filled with dust will clog the compressor air cleaner, and the air intake valves. Situate the equipment so it is plumb and level at all times. If the unit is placed in a confined area, circulation is restricted, the unit will heat up, and result in improper operation. Locate the equipment so that the hose reels and lubricant pumps are easily accessible.

Warning: **Do not operate the lubricating and servicing unit in an inclosed area unless the exhaust gases are piped to the outside. Inhalation of exhaust fumes will result in serious illness or death.**

Section II. MOVEMENT TO A NEW WORKSITE

11. Dismantling for Movement

a. Preparation for Shipment.

(1) This equipment requires safe and proper storage of grease guns, adapters, and starting rope, when securing for movement to a new location.

(2) Disconnect the battery cables from the batteries.

(3) Release all air from the air storage tanks.

(4) Disconnect and drain lines and hoses.

(5) Lock the hose reels by applying the reel brakes to each of the five reels.

(6) Make sure that all drawers and doors on the housing are securely latched in place.

(7) Wrap the entire housing with a steel handling strap.

b. Loading and Transporting Equipment.

(1) Refer to paragraph 6, and load the unit on the carrier.

(2) Secure the unit to the carrier with cleats, tiedown cables, and turnbuckles. See figure 5.

12. Reinstallation After Movement

Procedures required for reinstallation of the equipment after movement to a new location are identical to those procedures required for installation or setting up new equipment (para 10).

Section III. CONTROLS AND INSTRUMENTS

13. General

This section describes, locates, illustrates, and furnishes the operator, crew, or organizational maintenance personnel sufficient information about the various controls and instruments for proper operation of the lubricating and servicing unit.

14. Controls and Instruments

The purpose of the controls and instruments and the normal and maximum reading of the instruments are illustrated in figures 6, 7, 8, and 9.

15. Magneto-Ignition Switch

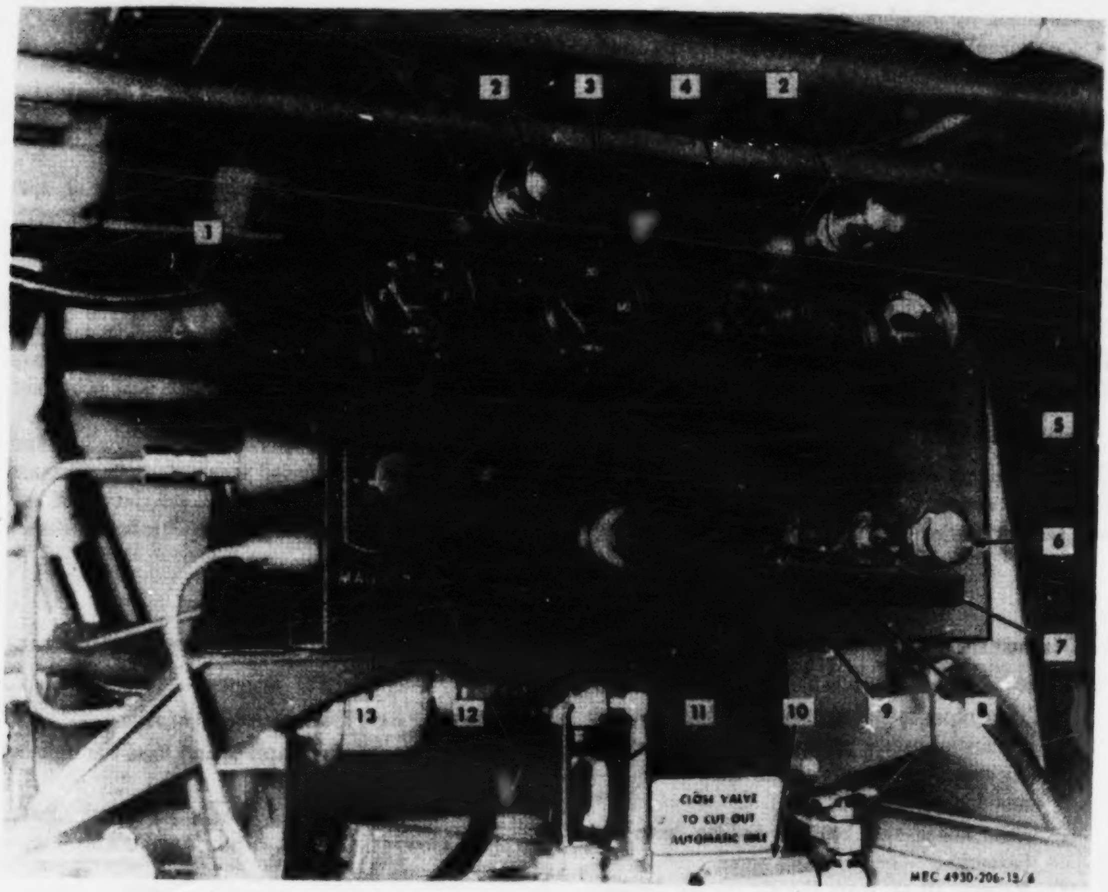
The Magneto-Ignition switch (13, fig. 6) is a single pole, double throw type with manual knob. The manual knob latches in ON position and cannot release to RUN insuring automatic shutdown in case of oil failure, unless pressure builds up to normal on the initial start of the engine.

16. Start Button

A push-button type start button (6, fig. 6) is located in the lower right hand corner of the control panel.

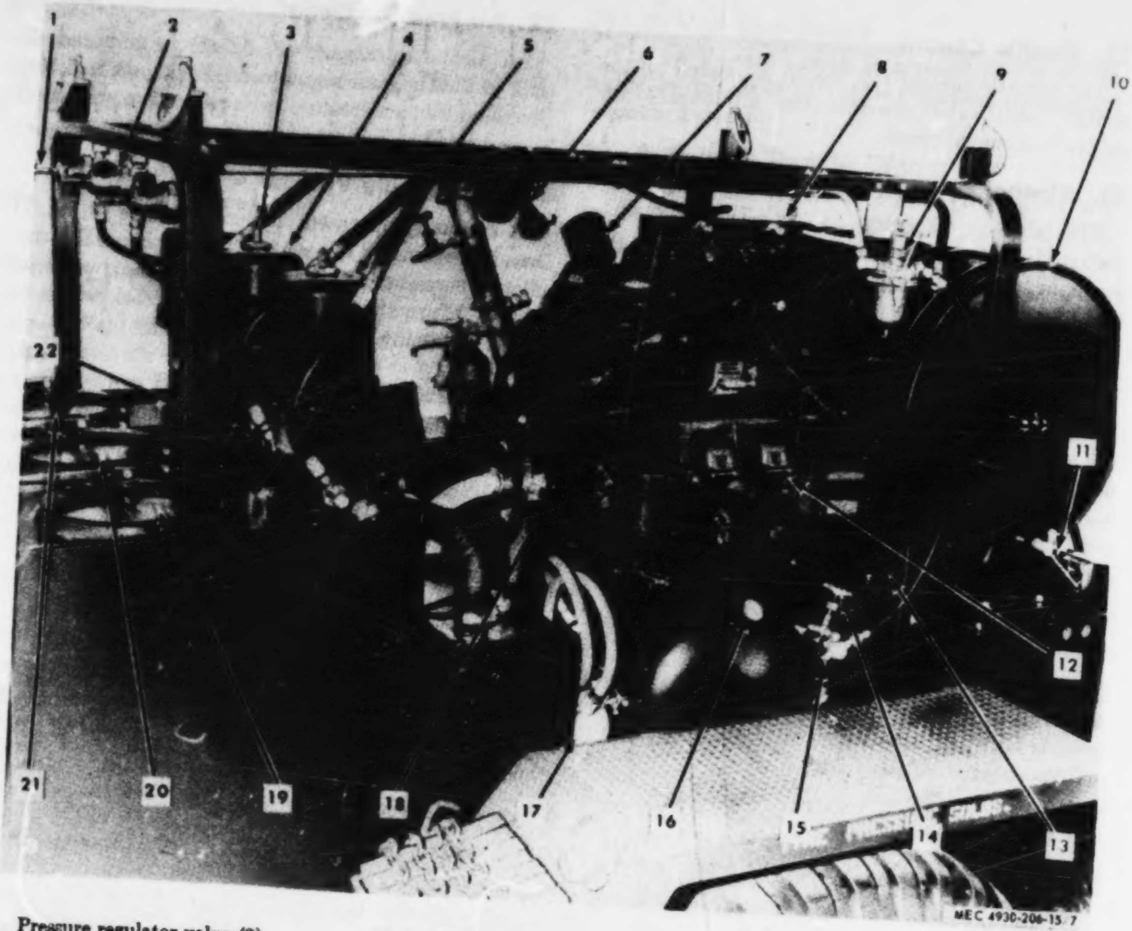
17. Choke Control

The choke control (9, fig. 6) is located on the engine control panel and enables the operator to



1 Fuel gage
2 Panel light (2 ea)
3 Oil pressure gage
4 Oil temperature gage
5 Bat-Gen gage
6 Start button
7 24V start switch
8 Panel light switch
9 Choke control
10 Automatic throttle control
11 Engine fuel filter
12 Throttle control
13 Magneto ignition switch

Figure 6. Engine control panel.



1 Pressure regulator valve (3)
2 Air pressure gage (3)
3 Condensate valve (3)
4 Gear oil pump (2)
5 Engine oil pump
6 Trouble light
7 Compressor air filter
8 Control panel
9 Alcohol injector
10 Hose reel assembly
11 Reel brake (5)
12 Engine assembly
13 Clutch lever
14 Master valve
15 Air relief cock
16 Air gage
17 Portable lubricator and bracket
18 Fly wheel sheave
19 Engine oil fill cover
20 GAA grease fill cover
21 Gear lubricant fill cover
22 Circulating valve (3)

Figure 7. Controls and instruments, engine side.

enrich the fuel mixture for starting purposes. Pull out the choke control to enrich the fuel-air mixture in the carburetor.

18. Oil Pressure Gage

The oil pressure gage (3, fig. 6) is mounted on the upper left center of the control panel and is a dial-type instrument which indicates oil pressure in pounds per square inch. Under normal operating conditions, the oil pressure gage should indicate a reading of between 20 and 35 psi after the engine is thoroughly warmed.

19. Bat-Gen Indicator Gage

The BAT-GEN indicator gage (5, fig. 6) is located on the control panel. It is a dial-type instrument which shows if the generator is properly charging or the battery discharging. The indicator will be just past the 0 mark on the charge side when operating properly.

20. Panel Lights

Two panel lights (2, fig. 6) are located at the top front of the control panel and are operated by a single toggle-switch mounted between the START and THROTTLE controls.

21. Throttle Control

The throttle control (12, fig. 6) is located on the control panel and provides the adjustment for controlling engine speed.

22. Alcohol Dispenser

The alcohol dispenser (9, fig. 7) is bracket-mounted to the engine side of the lubricating and servicing unit, and is used to prevent freezing of condensed air in the air lines and pumps. A needle valve controls the rate of alcohol flow from the dispenser.

23. Master Air Valve

The master air valve (14, fig. 7) is located at the air receiver on the engine side of the lubricating unit. The valve releases air from the air receiver, and controls the air pressure supply in all lines issuing from the air receiver. To release air from the air receiver, turn the handle counterclockwise.

24. Clutch Lever

The clutch lever (13, fig. 7) on the clutch or power takeoff assembly engages or disengages the load from the engine. The clutch is engaged when the lever is in forward position (toward the hose reels) and disengaged when moved back. To engage the clutch, apply constant pressure until the clutch belt rises and snaps into position.

25. Reel Brake

A hand-operated reel brake (10, fig. 9) is mounted on the hub of each hose reel to permit locking of the hose reels at any position during operation or after operation. The reel brake is a lever-type control.

26. Engine Exhaust Director Handle

The engine exhaust director handle (6, fig. 8) is used to either direct heat from the engine exhaust into the hot air reservoir, or direct exhaust gases through a hose to the atmosphere outside the unit.

27. Air Regulators

Individual air regulators (1, fig. 7) for the three lubricating pumps are mounted on the air line between the air receiver and the lubricant pumps. Air pressure and speed to the lubricating pumps are controlled by the air regulators. The exact air pressure to operate the pumps must be determined by the operator, based upon volume or delivery rate required. To increase air pressure to the pumps turn the regulator handle clockwise.

28. Air Pressure Gage

An air pressure gage (2, fig. 7) is mounted on each of the three air regulators. Each gage registers the amount of air pressure to its respective pump and is graduated to indicate from 0 to 200 psi.

29. Condensate Valves

A manually operated condensate valve (3, fig. 7) is mounted on top of each pump, and is used to discharge accumulated moisture from the pump air motor. Turn the valve handle counterclockwise to dispel moisture.

30. Circulating Valve

A circulating valve (22, fig. 7) is mounted on the lower housing of each pump, and permits the bypassing and circulating of lubricants with the pump returning directly into the lubricant compartment. To open the circulating valve turn the valve handle counterclockwise two full turns.

31. High Pressure Control Valve

A high pressure control valve (7, fig. 9) is attached to both the engine oil hydraulic line and the gear oil hydraulic line. Depress the trigger on the high pressure control valve to dispense lubricants, and release the trigger to halt lubricant flow.

32. Metered Control Valve

A metered control valve (6 and 11, fig. 9) is attached to both grease reel hydraulic lines. Depress the trigger on the control valve to dispense the lubricants and release the trigger to halt lubricant flow.

33. Air Line Coupling Socket

The air line coupling socket (8, fig. 9) on the reel end of the lubricating and servicing unit is used to supply compressed air to the various air-operated accessories.

34. Air Tank Drain Valve

A manually operated air tank drain valve (9, fig. 9) is mounted on the reel bank hose reeler panel, and is directly connected by a length of hose to the drain valve to facilitate draining moisture, and releasing air pressure, from the air receiver.

35. Air Receiver Pressure Gage

The air receiver pressure gage (16, fig. 7) is located on the outside end of the air pressure tank and just under the engine assembly. The gage is graduated from 0 to 300 psi and should show a pressure of 150 to 175 psi for proper operation of the equipment.

36. Air Line Pressure Relief Cock

The air line pressure relief cock (15, fig. 7) is located at the air receiver on the engine side of the lubricating unit. The relief cock releases air pressure in the lines to the pumps and air reel.

37. Oil Temperature Gage

The oil temperature gage (4, fig. 6) is mounted on the upper right center of the control panel and is a dial type instrument which indicates temperature in degrees Fahrenheit. Under normal conditions the oil temperature gage should indicate between 160° and 180° when the engine is thoroughly warmed.

38. 24 Volt Start Switch

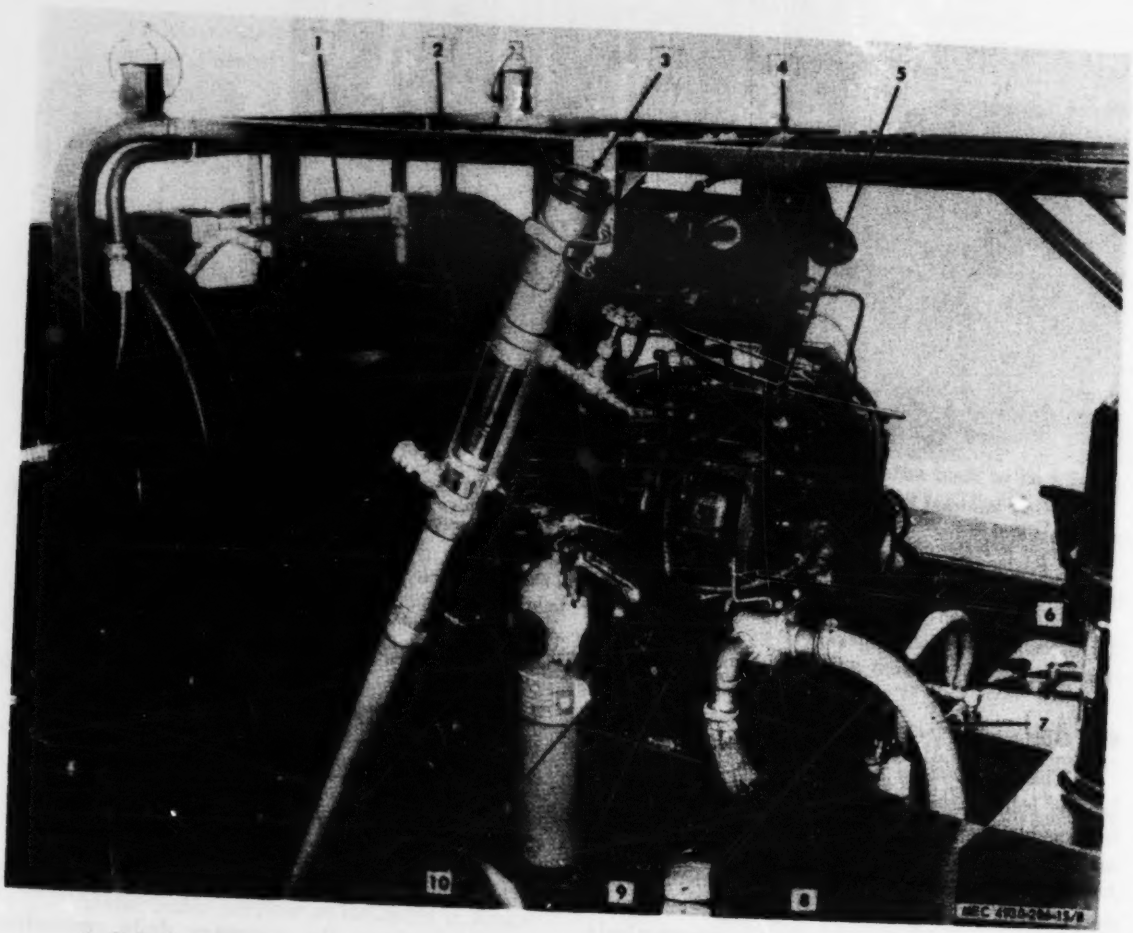
The 24 V start switch is a standard (7, fig. 6) toggle switch used to cut the current on and off from the battery.

39. Automatic Throttle Control

The automatic throttle control (10, fig. 6) will keep the engine at idle speed until a load is applied. This control is equipped with a valve that can be closed so the engine can be idled manually.

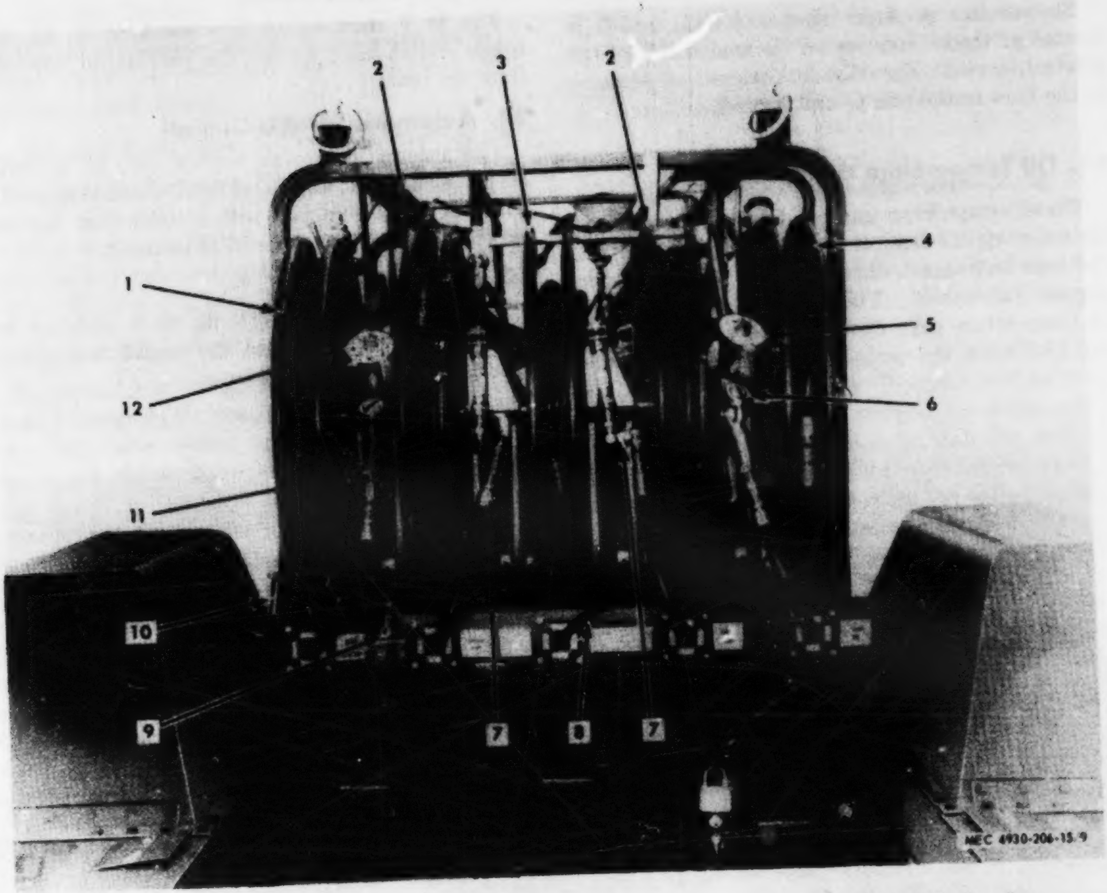
40. Engine Fuel Filter

The engine fuel filter (11, fig. 6) is designed to clean foreign material from the engine fuel before the fuel enters the carburetor.



1 Drive belt guard
2 Compressor assembly
3 Transfer pump
4 Trouble light
5 Engine assembly
6 Exhaust deflector handle
7 Exhaust tube
8 Exhaust tube
9 Fire extinguisher
10 Unloader valve

Figure 8. Controls and instruments, compressor side.



1 Gear lubricant hose reel
2 Grease hose reel
3 Air hose reel
4 Engine oil hose reel
5 Quartmeter
6 Quartmeter, control valve
7 High pressure control valve
8 Air line coupler
9 Air tank drain valve
10 Reel brake (5)
11 Pintmeter control valve
12 Pintmeter

Figure 9. Controls and instruments, reel end.

Section IV. OPERATION OF EQUIPMENT

41. General

a. The instructions in this section are published for the information and guidance of the personnel responsible for operation of the lubricating and servicing unit.

b. The operator must know how to perform every operation of which the lubricating and servicing unit is capable. This section gives instructions on starting and stopping the lubricating and servicing unit, basic motions of the lubricating and servicing unit, and on coordinating the basic motions to perform the specific tasks for which the equipment is designed. Since nearly every job presents a diffierent problem, the operator may have to vary given procedures to fit the individual job.

42. Starting The Equipment

a. Preparation for Starting.

(1) Perform the necessary daily preventive maintenance services as indicated in figure 15.

(2) Check load requirements.

b. Electric Starting of Engine.

(1) Push the engine exhaust director handle (6, fig. 9) away from the operator and into position to direct the engine exhaust gases to the atmosphere outside the unit.

(2) Disengage the clutch lever (13, fig. 7) by pulling toward the engine.

(3) Close the choke control (9, fig. 6).

(4) Turn the 24-volt start switch (7, fig. 6) to ON position.

(5) Turn the magneto-ignition switch (13, fig 6) to ON position.

(6) Press the starter button (6, fig. 6) in firmly, to crank the engine. If the engine does not start on the second attempt, open the choke control before pressing the starter button again.

(7) After the engine starts, gradually pull the throttle control (12, fig. 6) out to speed engine if desired.

c. Manual Starting of Engine.

(1) Perform *b*(1) through (5) above.

(2) Wind the starting rope in a clockwise direction around the engine flywheel sheave (18, fig. 7), leaving about six inches free at the handle end.

(3) Give a fast strong steady pull the full length of the rope. If the engine does not start at the first attempt, increase choking and crank again.

(4) After the engine starts, gradually close the choke control until the engine runs smoothly and increase throttle if necessary.

43. Stopping The Equipment

a. Normal Stopping.

(1) Disengage the clutch (13, fig. 7) by pulling the lever toward the engine, away from the hose reels.

(2) Turn the Mag-Ign switch (13, fig. 6) to OFF position.

(3) Close the master air valve (14, fig. 7) and open the air line pressure relief cock (15, fig. 7) to release air pressure in the air lines.

(4) Turn the 24 V-Start switch (7, fig. 6) to OFF position.

(5) Perform the necessary daily preventive maintenance services as indicated in figure 15.

b. Emergency Stopping. Turn the Mag-Ign switch to OFF position.

44. Operation Under Usual Conditions

a. Start the equipment as indicated in paragraph 42.

b. Refer to the following paragraphs for complete operation of the lubricating and servicing unit.

45. Filling Lubricant Tanks

a. Allow the engine to reach operating temperature and check the BAT-GEN gage (5, fig. 6).

b. Engage the clutch lever (13, fig. 7) by moving it toward the hose reels.

Note. Engage the clutch slowly, allowing enough time for the compressor to gain speed before fully engaging the clutch.

c. Close the master air valve (14, fig. 7) and the air pressure relief cock (15, fig. 7) at the air receiver.

d. Air pressure in the tank will automatically build to 175 pounds. The pressure switch is preset to cut out at 175 pounds pressure and cut in at 140 pounds pressure.

e. Allow pressure to build until the air receiver pressure gage (16, fig. 7) shows a reading of between 150 and 175 pounds air pressure.

f. Remove the transfer pump (fig. 10) from its mounting and install in the drum of lubricant to be dispensed.

g. Remove the transfer pump hose assembly (1, fig. 10) from the toolbox assembly and install on the transfer pump assembly.

h. Pull out the air hose coupler (8, fig. 9) and attach it to the air coupling on the transfer pump (3, fig. 10).

i. Open the fill cover (19, 20, or 21, fig. 7) and insert the transfer hose into the tank to be filled.

j. Open the master air valve (14, fig. 7).

k. Open the air valve (2, fig. 10) on the transfer pump to the required volume.

l. When the hopper is filled, stop the engine (para 43).

Note. Always keep lubricant containers three-quarters full.

m. Clean and store the transfer pump and hose in their respective positions.

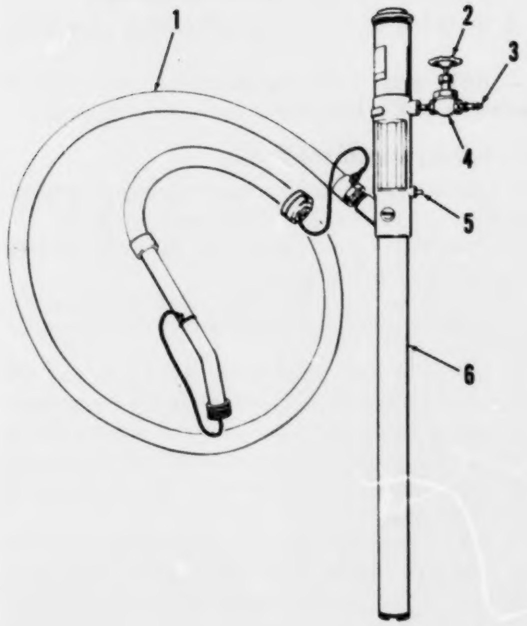
n. Close the master air valve (14, fig. 7) and open the air line pressure relief cock (15, fig. 7) to release the air pressure in the hose to the air reel.

o. Open the drain valve (9, fig. 9) to drain moisture and air pressure from tank.

46. Preparing Lubricant Pumps for Operation

a. Perform procedures in paragraph 45*a* through *j*.

b. Open the pump enclosure access door and turn the handles of the air pressure regulator valves (1, fig. 7) conterclockwise, to control the air pressure and speed of each pump.



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1	Transfer hose	4	Air valve
2	Air valve handle	5	Grease fitting
3	Air coupling	6	Transfer pump

Figure 10. Transfer pump assembly.

c. Open the master air control valve (14, fig. 7), close the air line pressure relief cock (15, fig. 7) and air tank drain valve (9, fig. 9).

d. Turn the air regulator handles clockwise, until set at the desired air pressure, as registered on the air gage (16, fig. 7).

e. Air pressure to each pump must be adjusted at the individual pump. Turn the air regulator handle clockwise to increase air pressure, and counterclockwise to decrease air pressure. The exact air pressure to operate pumps must be based on delivery rate required, viscosity, and temperature of lubricant.

f. Open the circulating valve (22, fig. 7) of each pump by turning the valve handle two full turns counterclockwise.

g. After charging pump with lubricant, close each circulating valve by turning them two turns clockwise.

h. Open the hose reel access door, release the reel brake (10, fig. 9) from the lubricant reel to be used. Unhook the control valve (fig. 9) from the bracket, and pull the hose from the reel.

i. Squeeze open the control valve (6, 7, or 11, fig. 9) by depressing the trigger, and the pump will automatically start filling the line and forcing lubricant through the control valve nozzle or adapter.

j. Allow lubricant to flow until the line has been purged of air, and no aerated lubricant is dispensed.

k. Repeat the operation on the other three lubricant hoses. The lubricating unit is now ready to dispense lubricant.

47. Dispensing Lubricants

a. Dispensing General Purpose Grease.

(1) Prepare the lubricant pump (4 or 5, fig. 7) for operation. Refer to paragraph 46.

(2) Release the reel brake (10, fig. 9) from one of the general purpose grease reels and pull out the required length of hose.

(3) Attach the proper adapter from the lower drawer assembly (fig. 11).

(4) Clean each grease fitting of the part being lubricated. Attach the adapter to it and squeeze the trigger.

(5) When all the old grease has been forced out of the part being lubricated, release the trigger. Disconnect the adapter and go on to the next fitting.

(6) When lubricating is complete, disconnect the adapter from the control valve. Wipe it clean and return it to the accessory drawer. Rewind the hose on the reel and replace the control valves on the bracket. Secure the reel brake.

b. Dispensing Gear Oil.

(1) Prepare the gear oil pump (4, fig. 7) for operation. Refer to figure 46.

(2) Release the reel brake (10, fig. 9) and pull out the required length of hose. Set the meter pointer (5, fig. 9) to 0.

Caution: **Do not try to set the pointer beyond the 0 position.**

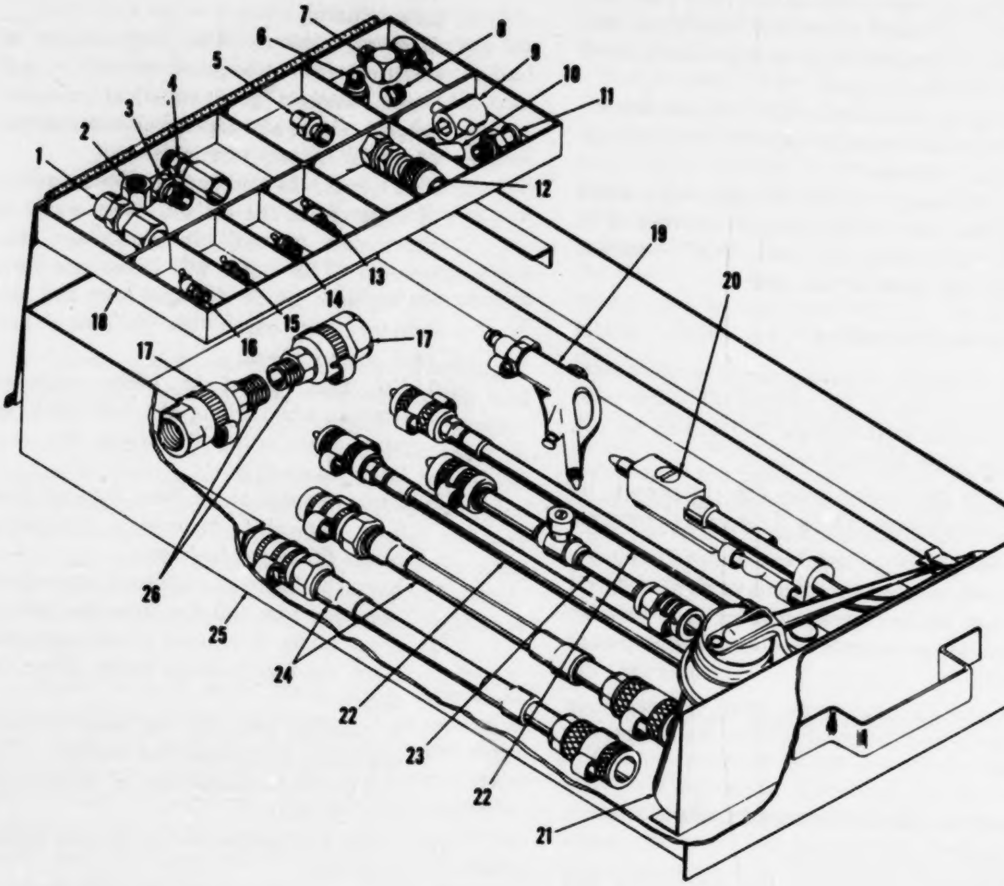
(3) Clean around the filler plug opening of the unit to be filled. Remove the filler cap or plug. Insert the valve nozzle into the filler opening and add the proper amount of oil.

(4) Clean and replace the filler plug or cap.

(5) Rewind the hose, set the reel brake, and hang the valve on the bracket.

c. Dispensing Engine Oil.

(1) Prepare the engine oil pump (5, fig. 7). Refer to paragraphs 45 and 46.



MEC 4930-206-15/11

1	Hose coupling
2	Hose coupling
3	Hose coupling (2)
4	Hose coupling (2)
5	Fitting (6)
6	Volume control valve assy
7	Three-way swivel assy (3)
8	Pipe plug (2)
9	Easy-out tool
10	Easy-out tool
11	Button head fitting (6)
12	Button head fitting (6)
13	Hydraulic fitting (6)
14	Hydraulic fitting (6)
15	Hydraulic fitting (6)
16	Hydraulic fitting (6)
17	Coupler (2)
18	Parts tray assy
19	Blower valve assy
20	Air gage assy
21	Piston oiler
22	Flexible extension assy
23	Adapter assy
24	Flexible extension assy
25	Lower drawer
26	Nipple (2)

Figure 11. Lower drawer assembly.

(2) Release the reel brake (10, fig. 9), remove the valve from the bracket, and pull out the desired amount of hose.

(3) Set the meter pointer to 0.

Caution: **Do not try to set the pointer beyond the 0 position.**

(4) Clean around the filler plug. Remove filler plug, insert nozzle, and fill reservoir to proper level.

(5) Clean and replace plug. Rewind hose, set reel brake, and return valve to bracket.

d. Use of Air Chuck.

(1) Remove the air chuck and pressure gage (20, fig. 11) from the lower drawer assembly.

(2) Attach the air pressure gage and air chuck to the air line coupler (8, fig. 9).

(3) Press the air chuck down firmly on the tire valve. It will automatically force air into the inner tube. When the proper pressure has been reached, lift the air chuck off. The air shuts off automatically.

(4) After air service operations have been performed, rewind the air reel hose, disconnect the air pressure gage and air chuck from the air line coupler.

(5) Lock the reel brake and replace the air chuck and pressure gage in the lower assembly drawer.

Warning: **When inflating tires, stand to one side of the tire, not in front of it. Serious injury, or death, could result if the tire blows off the rim.**

48. Shutdown Procedure

a. With the pumps operating, open the condensate bleeder valve (3, fig. 7) by turning the valve lever in a counterclockwise direction. Exhausting air will carry accumulated moisture with it.

b. Declutch the engine from the compressor by pulling the clutch lever (13, fig. 7) toward the engine.

c. Stop the engine.

d. Close the master air control valve (14, fig. 7) and open the air line pressure relief cock (15, fig. 7) to release air pressure in the hoses to the pumps and air reels.

e. Open the air tank drain valve (9, fig. 9) to drain moisture and air pressure from the compressor air receiver.

49. Operation Under Unusual Conditions

a. Operation in Extreme Cold.

(1) *General.* Operating the lubricating and servicing unit in extremely cold temperatures presents special problems. Lubrication, fuel, oil, electrical and compressed air systems, and care of lubricants are all affected by cold weather operation.

(2) *Care of lubricants.* Keep lubricants in tightly closed containers and, if possible, in a protected place to insure ease of handling. Remove all snow and ice from the containers before opening them to transfer lubricants to lubricant tanks or to guns.

(3) *Special equipment.* The unit is equipped with an alcohol dispenser (9, fig. 7) for cold weather operation, and a heat exhaust director (6, fig. 8). The alcohol dispenser prevents freezing of condensate in air lines. The exhaust director uses heat from the exhaust to warm lubricant containers.

(4) *Lubrication.* During cold weather, lubricants that are too heavy will make the vehicle hard to start and difficult to operate. This will also cause rapid wear of the moving parts.

(5) *Electrical system.* The large surges of electrical current required to start a cold engine demand good electrical contacts. Inspect, clean, and tighten all connections, especially battery terminals.

(6) *Fuel system.* In cold weather, condensation of moisture in the air will cause water to accumulate on tools, in drums and containers. This water will freeze and form ice crystals, which clog fuel lines and carburetor jets unless the following precautions are taken:

(*a*) Use filter paper or other approved strainer when filling the fuel tank, or when transferring fuel from one container to another.

(*b*) Remove snow or ice from the fuel tank filler cap and dispensing equipment before filling the fuel tank.

(*c*) Keep the filler cap tightened properly to keep moisture and dirt from the tank.

(*d*) After filling or moving a fuel container, allow the fuel to settle before filling the tank.

(*e*) If possible, keep the fuel tank full when operating in extreme cold weather. This will prevent condensation of moisture inside the tank.

(*f*) Drain and service the fuel filter at regular intervals.

(7) *Air cleaner.* At subzero temperatures, do not use oil in the air cleaner assembly, as it will congeal and prevent the easy flow of air. Wash the filter elements in approved cleaning solvent, and dry thoroughly.

(8) *Compressed air system.* Drain accumulated moisture from the compressed air reservoir as often as necessary. The air reservoir is equipped with a drain cock (15, fig. 7) located at the end of the drain tank. When the drain cock is rotated counterclockwise, the water which has collected in the bottom of the tank will run out.

(9) *Batteries.* The batteries installed in the lubricating unit will give satisfactory service in extreme low temperatures if care is taken to keep the batteries fully charged. If the lubricating unit is to remain idle for any long length of time during cold weather, disconnect the batteries and store them in a warm place.

(10) *Cold engine starting.* Before attempting to start in subzero weather, make certain the consistency of the crankcase oil is such that the engine can be started. Check the controls to make sure they are free and in operating condition. When the engine starts, avoid letting it stall by leaving the choke partly open, but be careful not to flood the carburetor.

(11) *Valves.* Be extremely careful in operating all valves as they can be easily damaged in low temperature.

b. Operation in Extreme Heat. When operating in extreme high temperatures, efficient cooling and adequate lubrication of the engine and air compressor is vitally important. The cooling system must be checked frequently to make sure the air circulation is not impaired. Give special attention to the engine shrouds and fins for cleanliness. Inspect the carburetor air cleaner frequently. Make sure the oil in the air cleaner is at proper level, and clean. Lubricate more frequently than specified in the lubrication order, figure 14.

c. Operation in Dusty or Sandy Areas. Operation of the lubricating and servicing unit in sandy or dusty areas will require more frequent inspections, and lubrication of the unit. Fine sand can penetrate into bushings and bearings. Remove accumulations of sand and dirt at frequent intervals. Inspect the engine and compressor shroud and fins for clogging or impairment of air circulation. Check the fuel system and take all necessary precautions to prevent sand from entering the fuel tank. During shutdown periods, fasten all housing doors securely.

d. Operation Under Rainy or Humid Conditions. Operation of the lubricating and servicing unit under rainy or humid conditions requires that special attention be given exposed machined parts. A thin coat of oil should be applied to all exposed machined parts to keep them as free of moisture as possible. High moisture content in the air may cause difficulty in the electrical system. The spark plug, magneto and wiring can become unserviceable due to high humidity. Clean and dry affected parts at frequent intervals.

e. Operation in Salt Water Areas. In salt water areas, give special attention to general maintenance of the lubricating and servicing units, to prevent corrosion of the metal parts. Keep a thin coat of oil on all exposed machined parts, and keep parts as clean and free of moisture as possible. Make sure all unpainted spots are painted or coated with approved preventive compounds. When equipment has been exposed to salt water, steam clean or wash exposed areas with clean, fresh water as soon as possible; dry thoroughly.

50. Operation in High Altitudes

The air pressure above sea level decreases as altitude is increased. The result is a decrease in air pressure to the carburetor causing a too-rich gasoline-air mixture. If this condition interferes with the operation of the unit, adjust the carburetor in accordance with instructions provided in figure 16 of TM 5–2805–203–14.

Section V. OPERATION OF MATERIAL USED IN CONJUNCTION WITH THE EQUIPMENT

51. Handguns

a. General. A set of handguns, adapters, and couplers (figs. 11 and 12) are located in the accessory drawers below the hose reels. These handguns are used to dispense small quantities of grease, lubricants other than general purpose grease, and emptying and filling transmissions.

b. Hand Lever Gun. The high pressure hand lever gun (1, fig. 12) is used for lubricants required in small quantities, or for dispensing special lubricants. When operating the hand lever gun, best results are obtained by taking full strokes with the lever handle. If a heavy lubricant is used, it may be necessary to prime the lever gun occasionally. Special couplers and adapters provide contact for all types of fittings. To fill the lever gun, proceed as follows:

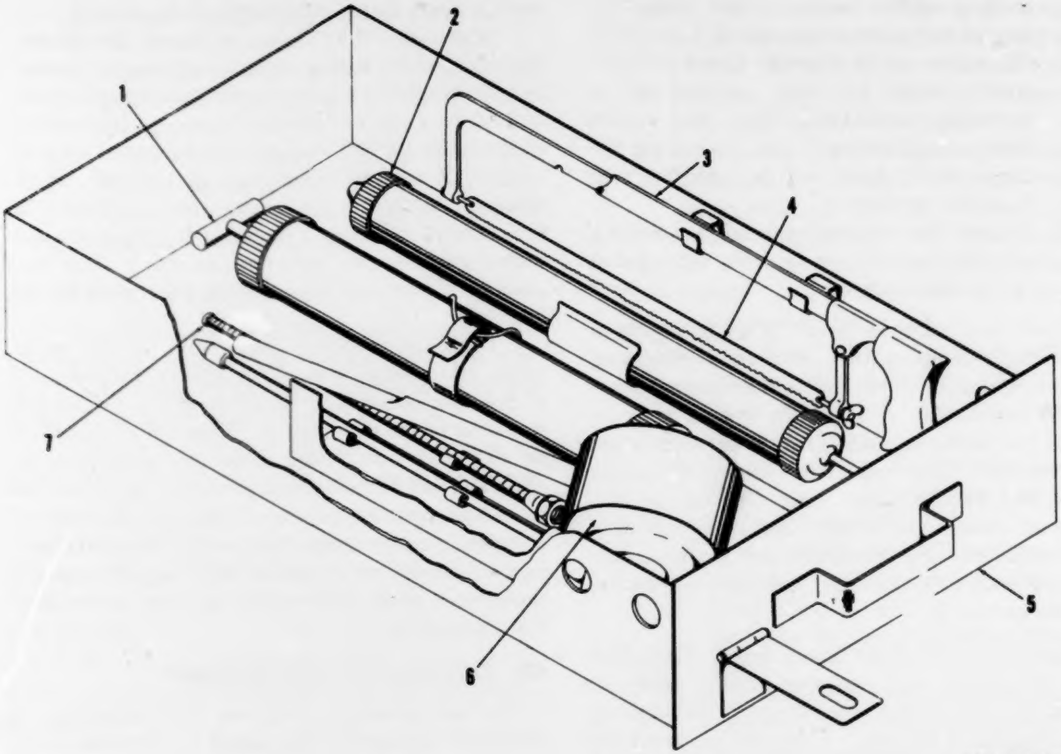
(1) Remove the container from the head assembly by turning the containers counterclockwise.

(2) Withdraw the follower rod from the container until the cross pin in the rod contacts the latch of the follower plate. Engage the rod to the follower, and push the rod and follower back into the container.

(3) Insert the open end of the container in the lubricant to insure against any air being sucked into the lubricant. Pull back on the follower rod, and fill the container slowly.

(4) Replace the container to the head assembly, and release the follower rod from the latch.

c. Suction Gun. Use the suction gun (2, fig. 12) for emptying or filling transmissions, differentials,



1 Grease gun assy
2 Suction gun assy
3 Hacksaw frame
4 Hacksaw blade (2)
5 Upper drawer
6 Oil spray gun
7 Flexible nozzle

Figure 12. Upper drawer assembly.

or any part of a vehicle that requires emptying, other than by drawing through a bottom outlet. Fill the suction gun by inserting the nozzle into the oil or fluid. Pull out the handle as far as it will go. When used for filling purposes, the suction gun is operated by inserting the nozzle into the oil hole. Push the handle forward until a sufficient quantity of oil has been delivered. When used for draining purposes, the suction gun is operated by inserting the nozzle into the drain hose of the housing. Pull out the utility gun handle as far as it will go, and a gun full of fluid will be removed. To empty, remove the nozzle from the drain hole and push in the handle as far as it will go.

d. Hand Oil Gun. Operate the hand oil gun (21, fig. 11) by squeezing the trigger. Use it for applying small quantities of oil to friction points.

52. Oil Spray Gun, Air Operated

a. General. Use the air operated oil spray gun (6, fig. 12) to obtain oil spray at high pressures. The gun consists of an oil spray container and a head with air oil valve. Separate controls adjust both the input quantity of air and the quantity of air ejected. An adjustable nozzle permits either a steady stream, or spray type oil injection.

b. Operation. Fill the container with the desired grade of oil. Screw the container into the head. Attach the air line coupler of the spray gun to the air line coupler (8, fig. 9) of the hose on the lubricating unit. Turn the adjustable nozzle to the closed position. Press the air valve button and open the nozzle until desired amount of oil ejection is obtained.

53. Air Blower Valve

The air blower valve (19, fig. 11) may be attached to the air line coupler (8, fig. 9) of the air hose on the lubricating unit to permit cleaning with air pressure.

54. Accessory Equipment

a. Air Chuck and Gage. An air chuck and gage (20, fig. 11) with quick-operating air line coupling nipple, used for inflating tires, is located in the lower drawer assembly.

b. Hack Saw Frame and Blade. The hack saw frame and blade (3 and 4, fig. 12) for use in cutting hose, when replacing reusable hose and fittings, are located in the upper accessory drawer.

c. Padlock. Two padlocks with two interchangeable keys per lock are used for locking the toolbox and both repair parts drawers.

d. Airline Coupling Socket and Nipple. Two airline coupling sockets (17, fig. 11) and nipple, to replace socket or nipple when necessary, are located in the lower accessory drawer.

e. Hose End Fittings. Hose end fittings for high pressure lubricant hoses are located in the lower accessory drawer.

f. Hose End Fittings. Two male reusable hose end fittings to replace hose end fittings of ¼ inch inside diameter air hoses, are located in the lower accessory drawer.

g. Hose Adapter Coupling. Two hose adapter couplings (22, fig. 11) to join high pressure lubricant hoses are located in the lower accessory drawer.

h. Giant Buttonhead Hose Assembly. Two giant buttonhead whip-end hoses, each with a 500 psi pressure relief valve, and equipped with giant buttonhead fittings, are part of the accessory equipment on the lubricating unit. One hose assembly is attached to the control valve on the GAA grease reels; the other is a replacement part and is stored in the lower parts drawer, figure 11.

i. Buttonhead Coupler Plug and Gaskets. Three buttonhead coupler plugs with attaching gaskets, to be used as replacement parts on the buttonhead pressure relief valve, are located in the lower accessory drawer, figure 11.

j. Hydraulic Adapter. Two hydraulic adapters, each with a quick-change connector, are provided in the lubricating unit. The adapters are for use with greasing equipment containing hydraulic lubrication fittings. One of the adapters is to be attached to the control valve on one of the grease reels; the other to be stored in the lower accessory drawer.

k. Extension Hydraulic Pressure Relief Adapter. One extension hydraulic pressure relief adapter, with 500 psi pressure relief valve, is furnished on the lubricating unit. The adapter is to be used for greasing seal-type lubrication points, to prevent rupturing seals when using power lubricating equipment. A sliding sleeve locks firmly on the coupler of the hydraulic adapter.

l. Straight Hydraulic Lubrication Fittings. Six each straight hydraulic fittings, to replace defective fittings if necessary, are located in the lower accessory drawer.

m. 45° Hydraulic Lubrication Fittings. Six each 45° hydraulic fittings, to replace defective fittings if necessary, are located in the lower accessory drawer.

n. Easy-Out Tool. The easy-out tool is used for removing grease fittings. It is located in the accessory parts tray of the lower drawer.

o. Air Blower Valve. The air blower valve (19, fig. 11) is used to control a stream of compressed air. The air is used for drying parts, or for blowing dirt and debris from cylinder heads, or other components. The air blower valve is located in the lower parts drawer.

p. Z-Swivel. The Z-swivel (7, fig. 11) is used for connecting the control valves to the supply hoses; thus permitting the valve to swivel for easy access to hard-to-reach fittings. The Z-swivel is located in the parts tray of the lower drawer.

q. Portable Lubricator.

(1) *The description.* The portable lubricator (17, fig. 7) is a self-contained unit and can be strapped to the operator's back. An air-powered piston forces grease to a booster valve, where pressure is built up by squeezing the valve handle.

(2) *Operation.*

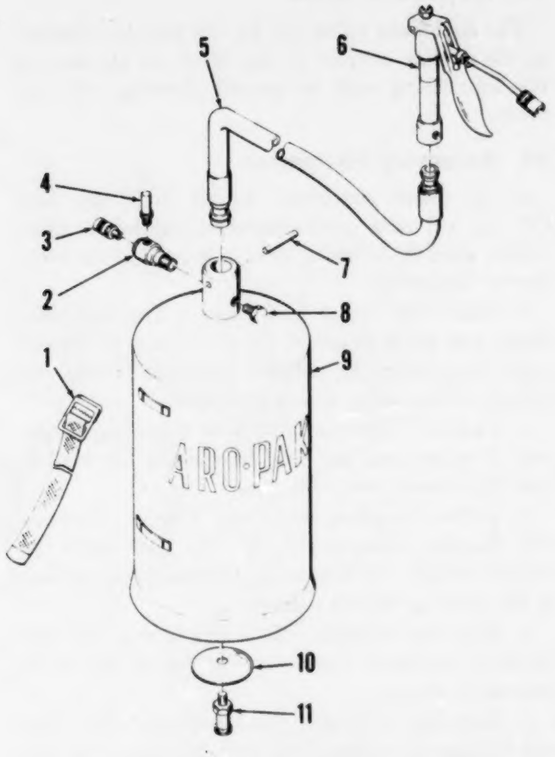
(*a*) With the lubricator (fig. 13) empty of grease, remove the valve stem (11, fig. 13) located on the bottom of the tank. Inflate the tank to 40 psi. Replace the valve stem. Do not over-inflate.

(*b*) Install lubricant hose (5, fig. 13) on the adapter and fill the tank with grease. The indicating valve (4, fig. 13) will show when tank is full. Do not overfill.

(*c*) Attach the lubricant hose and booster valve (6, fig. 13). The unit is now ready for operation.

Note. The portable lubricator need not be refilled with air when the tank becomes empty. The air charge will last about a year.

1	Carrying strap
2	Fitting adapter
3	Lubricator fitting
4	Indicating valve
5	Hose assy
6	Booster valve assy
7	Groove pin
8	Relief valve
9	Container assy
10	Information plate
11	Valve stem



MEC 4930-206-15/13

Figure 13. Portable lubricator assembly.

55. Fire Extinguisher (Carbon Dioxide Type)

a. Description. The carbon dioxide type fire extinguisher (9, fig. 8) is suitable for electrical and flammable liquid fires. The carbon dioxide types are of the 4-pound, 7½ pound, and 10-pound sizes. The 4-pound extinguisher is portable; and the other two are the fixed type.

b. Operation. Remove fire extinguisher from its location; break the seal, operate the control valve, and direct the stream at base of the flame.

c. Maintenance. For maintenance of the fire extinguisher, refer to TM 5-687.

56. Heat Director Controls

a. Exhaust Heat Director. The exhaust heat director lever (6, fig. 8) ducts gas either to a heat reservoir beneath the lubricant container or directly to atmosphere. Push the control handle to the right and exhaust gas is ducted outside the unit. Pull the control handle to the left and exhaust gas is ducted beneath the lubricant containers to warm the lubricant.

b. Operation in Cold Weather.

(1) In cold weather operation, pull the exhaust heat director to the left to duct exhaust gas to the heat reservoir.

(2) Start the engine and close all doors and louvers on the lubricating unit.

(3) Allow the engine to run for about ten minutes, then start the compressor.

(4) Wait until the compressor unloads before using the lubricating pumps.

57. Alcohol Dispenser

Use the alcohol dispenser (9, fig. 7) during cold weather operation. The dispenser is used to inject alcohol into the air lines leading to the pump to prevent condensate freezeup. The alcohol dispenser is equipped with an 8-ounce capacity metal bowl and a handle needle valve which controls the flow of alcohol.

CHAPTER 3

OPERATOR AND ORGANIZATIONAL MAINTENANCE INSTRUCTIONS

Section I. OPERATOR AND ORGANIZATIONAL MAINTENANCE TOOLS AND EQUIPMENT

58. Special Tools and Equipment

No special tools or equipment are required by the operator or organizational maintenance personnel for the maintenance of the lubricating and servicing unit.

59. Basic Issue Tools and Equipment

Tools and repair parts issued with or authorized for the lubricating and servicing unit are listed in Appendix III of this manual.

60. Organization Maintenance Repair Parts

Organizational maintenance repair parts are listed and illustrated in TM 5-4930-206-25P.

Section II. LUBRICATION

61. General Lubrication Information

a. This section contains a reproduction of the lubrication order and lubrication instructions which are supplemental to, and not specifically covered in the lubrication order.

b. The lubrication order shown in figure 14 is a reproduction of the approved lubrication order for the lubricating and servicing unit. For the current lubrication order, refer to DA Pam-310-4.

62. Detailed Lubrication Information

a. *Care of Lubricants*. When lubricating the unit, apply the various lubricants carefully. Keep the lubricant containers clean and free from foreign matter. Cover all containers tightly after use so the contents will remain usable.

b. *Points of Lubrication*. Lubrication points are readily located by reference to figure 14.

c. *Cleaning*. Use an approved cleaning solvent to clean all fittings and surrounding surfaces before lubricating. Dry parts thoroughly after cleaning.

d. *Operation Immediately After Lubrication*. Start and run the equipment for about five minutes after lubrication. Check carefully for any sign of oil leaks or faulty grease fittings. Should such signs appear, correct or report to proper authority prior to operating equipment.

Section III. PREVENTIVE MAINTENANCE SERVICES

63. General

To insure that the lubricating and servicing unit is ready for operation at all times, it must be inspected systematically so that defects may be discovered and corrected before they result in serious damage or failure. The necessary preventive maintenance services to be performed are listed and described in paragraphs 64 and 65. The item numbers indicate the sequence of minimum inspection requirements. Defects discovered during operation of the unit shall be noted for future correction, to be made as soon as operation has ceased. Stop operation immediately if a deficiency is noted during operation which would damage the equipment if operation were continued. All deficiencies and shortcomings will be recorded together with the corrective action taken on DA Form 2404 at the earliest possible opportunity.

LUBRICATION

ORDER

LO 5-4930-206-15

4 FEBRUARY 1965

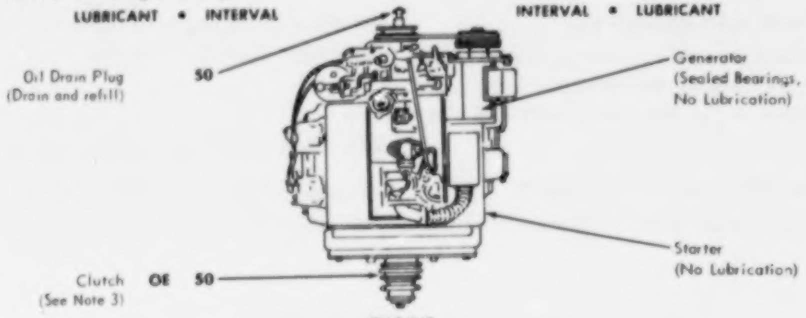
LUBRICATING AND SERVICING UNIT: TRAILER MOUNTED; 16 CFM COMPRESSOR; GASOLINE DRIVEN (GRAY COMPANY, INC. MODEL 251-437)

REFERENCE: TM5-4930-206-15, TM5-2805-203-14, LO5-2805-203-14, LO5-2330-216-15, AND C9100-IL

Intervals are based on normal hours of operations. Reduce to compensate for abnormal operations and severe conditions. During inactive periods, sufficient lubrication must be performed for adequate preservation.
Clean fittings before lubricating.
Relubricate after washing or fording.

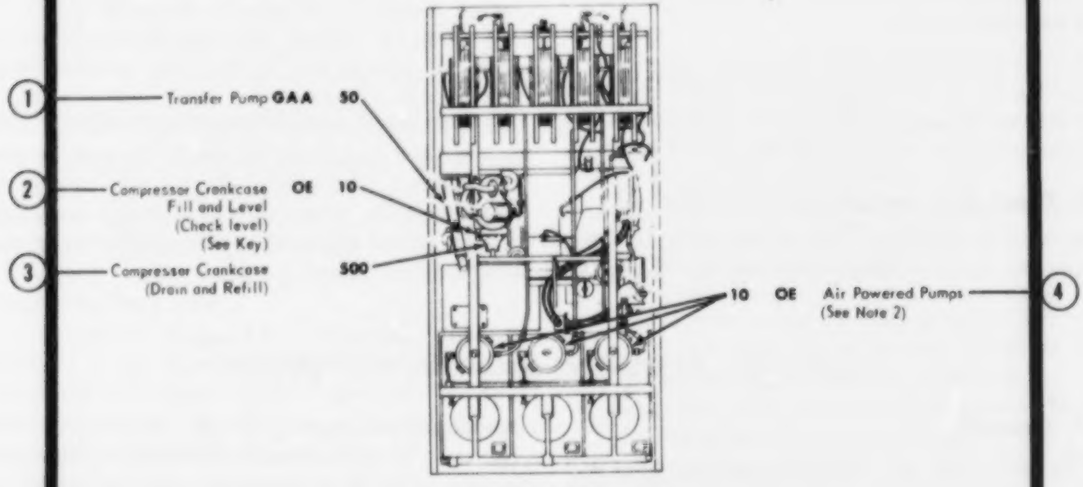
Clean parts with SOLVENT, dry cleaning, or with OIL, fuel, Diesel. Dry before lubricating.
Drain compressor crankcase when hot.
Fill and check level.

LUBRICANT • INTERVAL **INTERVAL • LUBRICANT**


Oil Drain Plug
(Drain and refill)
50
Generator
(Sealed Bearings,
No Lubrication)
Starter
(No Lubrication)
Clutch OE 50
(See Note 3)

ENGINE

FOLD
FOLD


①
Transfer Pump GAA 50
②
Compressor Crankcase
Fill and Level
(Check level)
(See Key)
OE 10
③
Compressor Crankcase
(Drain and Refill)
500
10 OE Air Powered Pumps
(See Note 2)
④

LUBRICATOR

MEC 4930-206-15/14 ①

Figure 14. Lubrication order.

– KEY –

LUBRICANTS		CAPACITY	EXPECTED TEMPERATURES			INTERVALS
			Above + 32°F	+40°F to –10°F	0°F to –65°F	
OE	OIL, Engine Heavy Duty		OE 30 or 9250	OE 10 or 9110	OES	Intervals given are in hours of normal operation.
	Compressor Crankcase	2 1/2 qt.				
	Oil Can Points					
OES	OIL, Engine, Sub-zero					
GAA	GREASE, Automotive and Artillery		All Temperatures			

NOTES:

1. FOR OPERATION OF EQUIPMENT IN PROTRACTED COLD TEMPERATURES BELOW - 10° F. Remove lubricants prescribed in the key for temperatures above 10° F. Clean parts with SOLVENT, dry-cleaning. Relubricate with lubricants specified in the key for temperatures below - 10° F.

2. AIR POWERED PUMPS. Every 10 hours before operating equipment, loosen screw above air inlet, apply OE sparingly and replace screw.

3. OIL CAN POINTS, Every 50 hours lubricate clutch, pins, clevises, control linkages and all exposed adjusting threads with OE.

Copy of this Lubrication Order will remain with equipment at all times; instructions contained herein are mandatory.

BY ORDER OF THE SECRETARY OF THE ARMY:

HAROLD K. JOHNSON
General, United States Army,
Chief of Staff.

OFFICIAL:

J. C. LAMBERT,
Major General, United States Army,
The Adjutant General.

FOLD

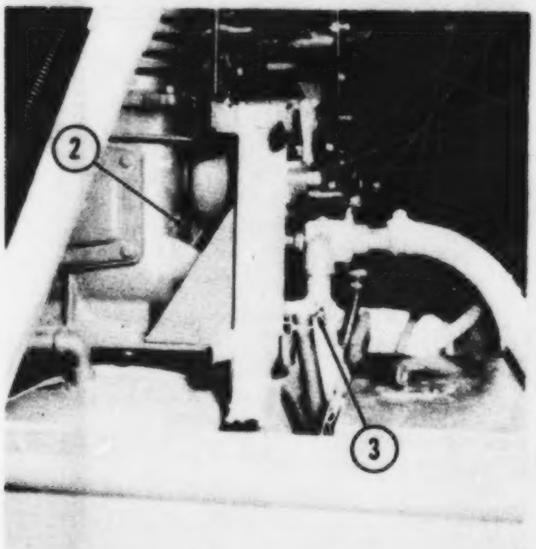
FOLD

MEC 4930-206-15/14 ②

Figure 14.—Continued.

Ref 1. Transfer Pump.

Ref 4. Air Powered Pumps.



Ref 2. Compressor Crankcase (Fill).
Ref 3. Compressor Crankcase (Drain).

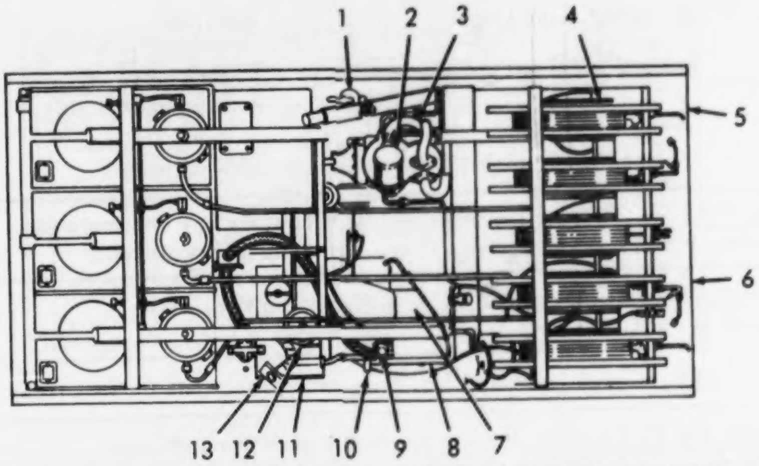
MEC 4930-206-15/14 ③

Figure 14.—Continued.

PREVENTIVE MAINTENANCE SERVICES

DAILY

TM 5-4930-206-15	GRAY CO., INC. MODEL 251-437	LUBRICATING AND SERVICING UNIT



LUBRICATE IN ACCORDANCE WITH CURRENT LUBRICATION ORDER

ITEM		PAR REF
1	FIRE EXTINGUISHER. Check condition of the fire extinguisher and inspect it for full charge. See that it is securely mounted.	55
2	COMPRESSOR AIR CLEANER. Inspect for secure mounting and loose connections. Inspect for cleanliness.	
3	COMPRESSOR. Inspect compressor head and cooling fins for any accumulation of dirt or rust.	
4	LEAKS. Check for lubrication leaks and air leaks. Check swivel joints at hose reel inlets.	
5	TOOLS AND EQUIPMENT. See that all tools and equipment assigned to the unit are in serviceable condition, clean and properly stowed.	54
6	BATTERIES. Check condition of batteries. Maintain proper electrolyte level. Make sure all cables are tight.	9
7	ENGINE. Inspect cylinder head and cooling fins for any accumulation of dirt or rust.	114

MEC 4930-206-15/15 ①

Figure 15. Daily preventive maintenance services.

ITEM		PAR REF
8	CONTROLS AND INSTRUMENTS. Inspect for damage and loose mounting. With unit operating, check for proper operation. Normal operating readings for instruments areas follows:	36.1
	Oil Pressure Gage — 20-35psi Oil Temperature Gage — 160°-180° BAT-GEN Indicator Gage — Slightly past "O" mark on charge side Air Receiver Pressure Gage — 150-175 psi.	
9	FUEL FILTER. Inspect the filter sediment bowl for any accumulation of water. Clean bowl and screen if any dirt or water are present.	
10	DRAINCOCK. Open the draincock for a short time to release moisture in the air receiver.	
11	FUEL TANK. Check fuel tank, fuel line, and connections for fuel leaks.	109
12	ENGINE AIR CLEANER. Inspect for secure mounting and loose connections.	
13	FUEL. Check the fuel supply. See that fuel tank is full.	
	NOTE 1. OPERATION. During operation observe for any unusual noise or vibration.	

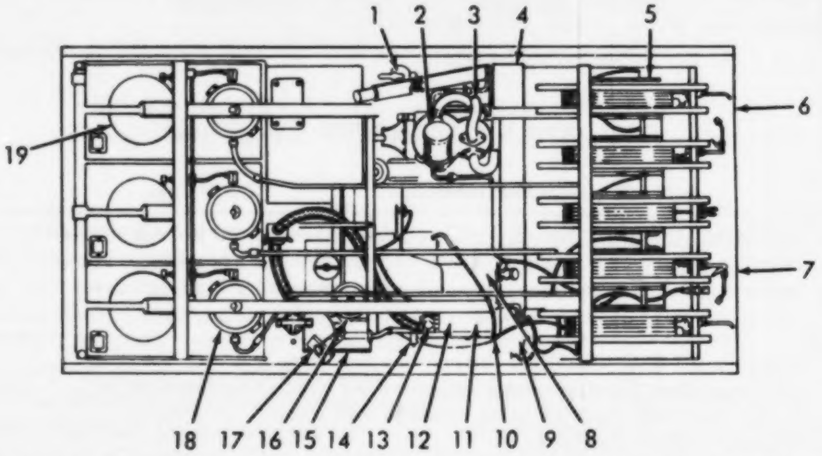
MEC 4930-206-15/15 ②

Figure 15.—Continued.

PREVENTIVE MAINTENANCE SERVICES

QUARTERLY

TM 5-4930-206-15	GRAY CO., INC. MODEL 251-437	LUBRICATING AND SERVICING UNIT



LUBRICATE IN ACCORDANCE WITH CURRENT LUBRICATION ORDER

ITEM		PAR REF
1	FIRE EXTINGUISHER. Check condition of the fire extinguisher and inspect it for full charge. See that it is securely mounted.	55
2	COMPRESSOR AIR CLEANER. Inspect for secure mounting and loose connections. Inspect for cleanliness.	
3	COMPRESSOR. Inspect compressor head and cooling fins for any accumulation of dirt or rust.	
4	BELTS AND PULLEYS. Inspect condition and tension of drive belts and pulleys.	
5	LEAKS. Check for lubrication leaks and air leaks. Check swivel joints at hose reel inlets.	
6	TOOLS AND EQUIPMENT. See that all tools and equipment assigned to the unit are in serviceable condition, clean and properly stowed.	54
7	BATTERIES. Check condition of batteries. Maintain proper electrolyte level. Make sure all cables are tight.	9
8	ENGINE. Inspect cylinder head and cooling fins for any accumulation of dirt or rust.	114

MEC 4930-206-15/16 ①

Figure 16. Quarterly preventive maintenance services.

ITEM		PAR REF
9	ALCOHOL INJECTOR. Inspect injector for proper operation, leakage and secureness of attachment.	
10	CONTROLS AND INSTRUMENTS. Inspect for damage and loose mounting. With unit operating, check for proper operation. Normal operating readings for instruments are as follows:	15-36.1
	Oil Pressure Gage — 20-35psi Oil Temperature Gage — 160°-180° BAT-GEN Indicator Gage — Slightly past "0" mark on charge side Air Receiver Pressure Gage — 150-175 psi.	
11	CARBURETOR AND LINKAGE. Check the carburetor and linkage to see that they are in good condition, correctly installed and assembled, See that carburetor does not leak, that linkage is not worn or binding, See that choke valve opens fully when control is in released position.	
12	FUEL PUMP AND HOUSING. Inspect the fuel pump and fuel lines for gasoline leaks. Check for oil leaks where the pump is fastened to the engine block and check for loose mounting and screws. Diluted oil indicates a faulty fuel pump.	
13	FUEL FILTER. Inspect the filter sediment bowl for any accumulation of water. Clean bowl and screen if any dirt or water are present.	
14	DRAINCOCK. Open the draincock for a short time to release moisture.	
15	FUEL TANK. Check fuel tank, fuel line, and connections for fuel leaks.	109
16	ENGINE AIR CLEANER. Inspect for secure mounting and loose connections.	
17	FUEL. Check the fuel supply. See that fuel tank is full. Check fuel strainer for cleanliness.	
18	LUBRICATION PUMPS. Inspect pumps for leakage and secureness of attachment. Inspect pump hoses.	
19	LUBRICANT HOPPERS. Inspect hoppers for cleanliness and leakage.	
	NOTE 1. OPERATION. During operation observe for any unusual noise or vibration.	
	NOTE 2. ADJUSTMENTS. Make all necessary adjustments during operational test.	

MEC 4930-206-15/16 ②

Figure 16.—Continued.

64. Daily Preventive Maintenance Services

This paragraph contains an illustrated tabulated listing of pneumatic maintenance services which must be performed by the operator. The item numbers are listed consecutively and indicate the sequence of minimum requirements. Refer to figure 15 for the daily preventive maintenance services.

65. Quarterly Preventive Maintenance Services

a. This paragraph contains an illustrated tabulated listing of preventive maintenance services which must be performed by organizational maintenance personnel at quarterly intervals. A quarterly interval is equal to three calendar months or 250 hours of operation, whichever occurs first.

b. The item numbers are listed consecutively and indicate the sequence of minimum requirements. Refer to figure 16 for the quarterly preventive maintenance services.

Section IV. OPERATOR MAINTENANCE

66. General

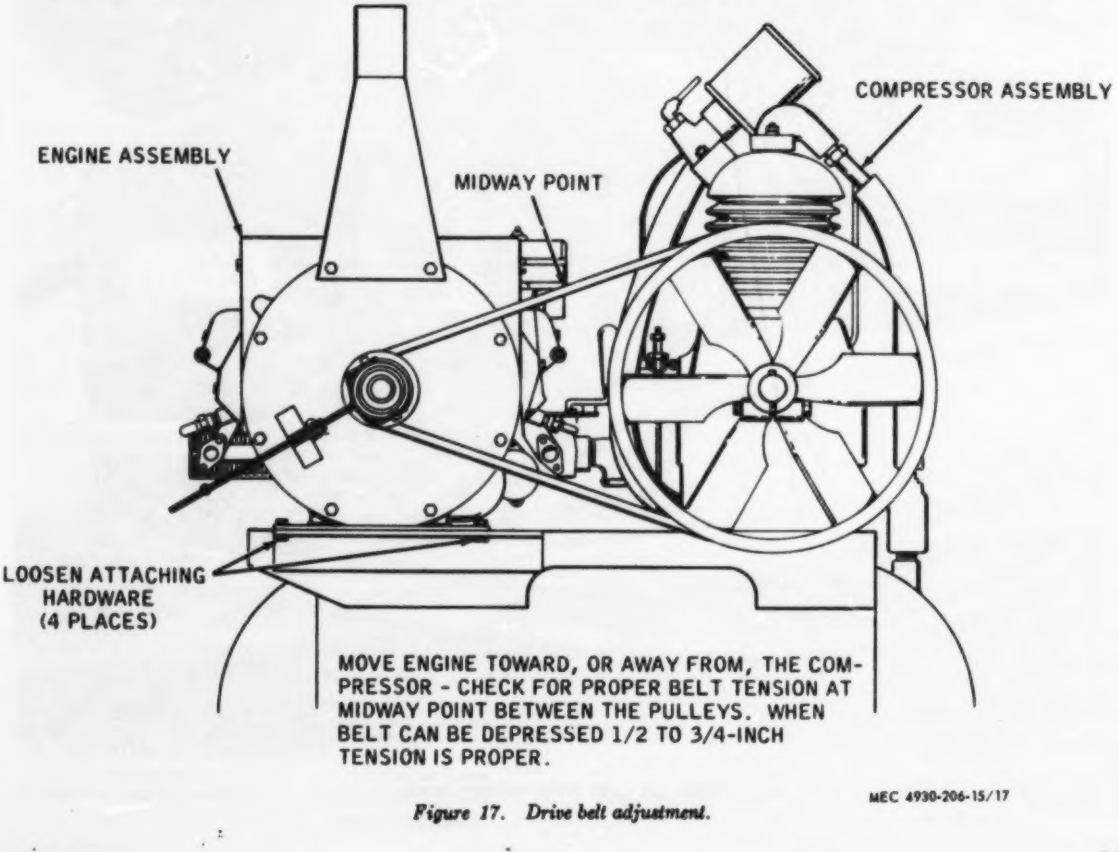
The instructions in this section are published for the information and guidance of the operator to maintain the lubricating and servicing unit. For operator maintenance of the Model 4A032-1 Engine Assembly refer to appendix I and the applicable technical manuals referenced. Refer to the following paragraphs for operator maintenance of the lubricating and servicing unit other than the engine assembly.

67. Fuel Filter Service

Service the fuel filter as instructed in the applicable manuals concerning the engine assembly referenced in appendix I of this manual.

68. Drive Belt Adjustment

Adjust the drive V-belt as illustrated in figure 17.



MOVE ENGINE TOWARD, OR AWAY FROM, THE COMPRESSOR - CHECK FOR PROPER BELT TENSION AT MIDWAY POINT BETWEEN THE PULLEYS. WHEN BELT CAN BE DEPRESSED 1/2 TO 3/4-INCH TENSION IS PROPER.

MEC 4930-206-15/17

Figure 17. Drive belt adjustment.

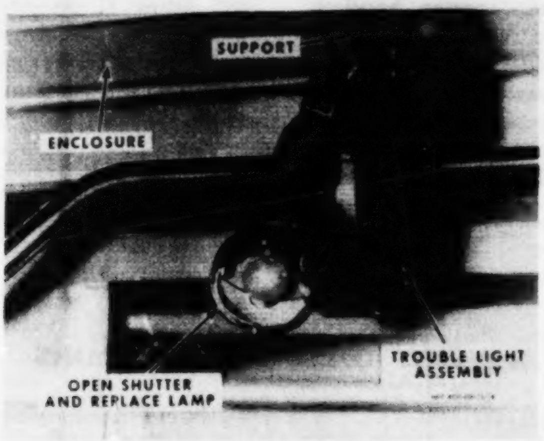

SUPPORT
ENCLOSURE
TROUBLE LIGHT ASSEMBLY
OPEN SHUTTER AND REPLACE LAMP

Figure 18. Trouble light replacement.

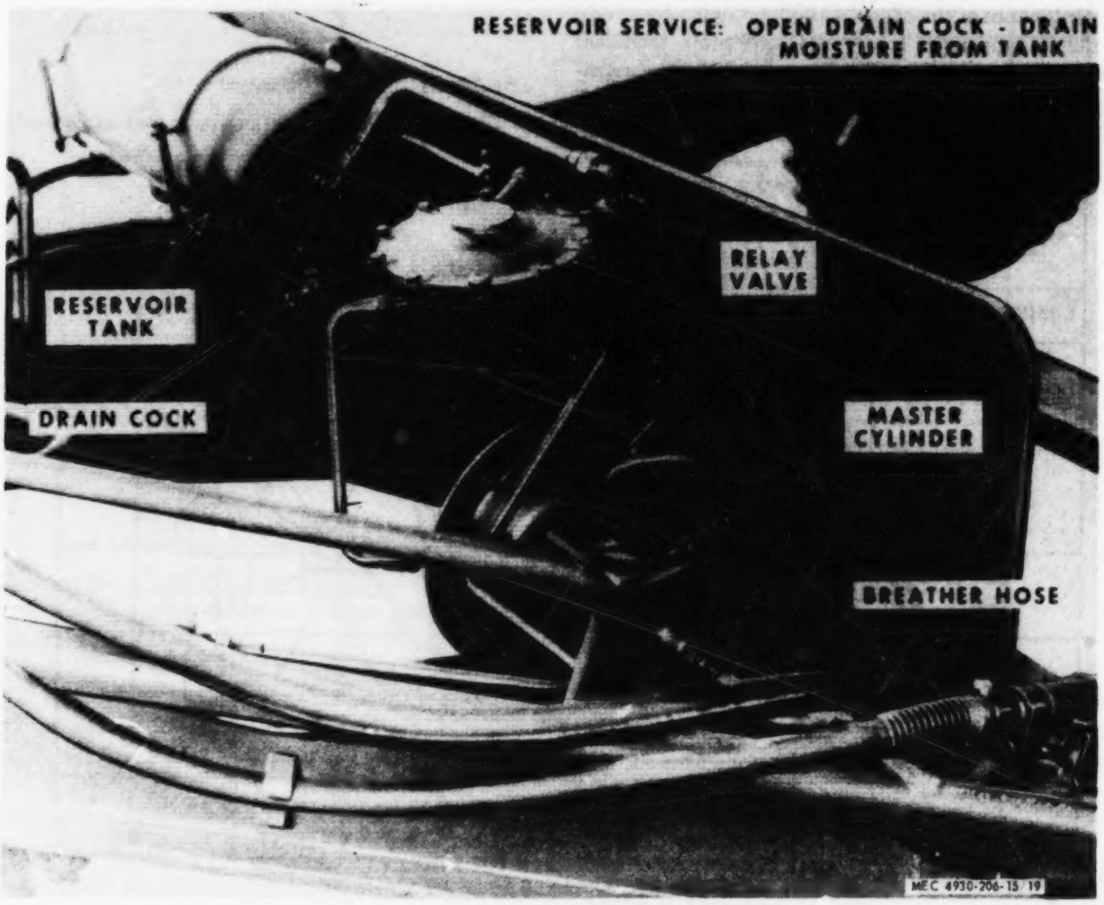

RESERVOIR SERVICE: OPEN DRAIN COCK - DRAIN MOISTURE FROM TANK
RELAY VALVE
RESERVOIR TANK
DRAIN COCK
MASTER CYLINDER
BREATHER HOSE
MEC 4930-206-15 19

Figure 19. Air brake reservoir service.

69. Trouble Light Lamp Replacement

Replace trouble light lamp as illustrated in figure 18.

70. Tires and Tubes

Check tires for correct inflation of 50 psi.

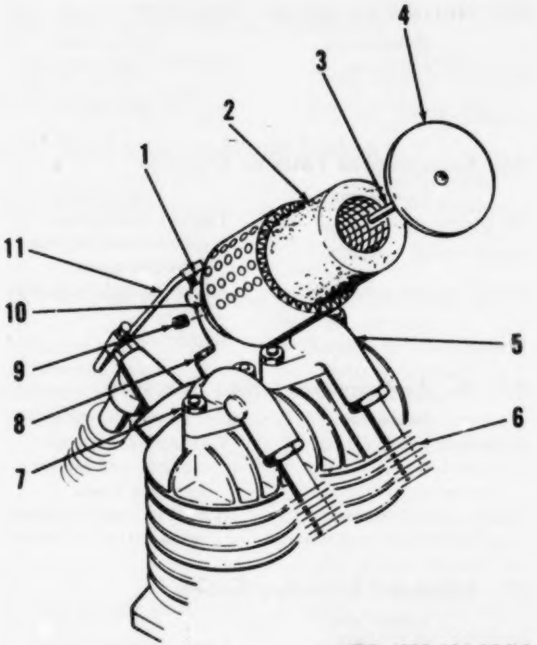
Note. In rough terrain or sandy soil deflate tires to 40 psi.

71. Air Brake Reservoir Service

Refer to TM 5-2330-216-15 to service the air brake reservoir.

72. Compressor Air Cleaner Service

Refer to figure 20 to disassemble and clean the compressor air cleaner. Reassemble in the reverse order.



1	Nut
2	Filter element
3	Screw
4	Cover
5	Manifold assy
6	Tube assy
7	Nut
8	Nut
9	Setscrew
10	Air cleaner assy
11	Tube

Figure 20. Air compressor filter service.

Section V. TROUBLE SHOOTING

73. General

This section provides information useful in diagnosing and correcting unsatisfactory operation or failure of the lubricating and servicing unit and its components. Each trouble symptom stated is followed by a list of probable causes of the trouble. The possible remedy recommended is described opposite the probable cause. Any trouble beyond the scope of organizational maintenance shall be reported to direct support maintenance.

74. Backfire at Carburetor

Probable cause	*Possible remedy*
Air leaks at intake manifold	Replace faulty intake manifold gaskets.
Fuel mixture too lean	Adjust carburetor.
Spark impulse advanced too far.	Time ignition.

75. Engine Lacks Power

Probable cause	*Possible remedy*
Carburetor or fuel pump not operating properly.	Replace fuel pump. If fuel pump is operating correctly, remove and inspect carburetor. Replace a defective carburetor.
Restricted air cleaner	Remove and clean the air cleaner.

Probable cause	*Possible remedy*
Restricted exhaust muffler or tail pipe.	Remove obstructions. If muffler or tail pipe is badly clogged, install a new muffler.

76. Starter Will Not Crank Engine

Probable cause	*Possible remedy*
Discharged or defective batteries.	Recharge or replace.
Loose connections	Tighten connections. Replace battery cables if necessary.
Defective switch	Replace switch.
Defective starter	Replace starter.

77. Starting Batteries Fail to Hold Charge

Probable cause	*Possible remedy*
Defective batteries	Recharge or replace batteries.
Loose battery connections	Tighten connections.
Defective regulator	Replace regulator.

78. Power Drops Under Heavy Load

Probable cause	*Possible remedy*
Poor compression	Tighten cylinder heads and spark plugs.
Faulty carburetor	Adjust, replace carburetor.
Restricted exhaust line	Remove obstructions. If badly clogged, install a new muffler.

79. Engine Misfires at Light Load

Probable cause	*Possible remedy*
Defective carburetor	Adjust or replace carburetor.
Defective spark plugs	Adjust or replace spark plugs.
Intake air leak	Replace gaskets.

80. Engine Misfires at Heavy Load

Probable cause	*Possible remedy*
Defective spark plugs	Adjust or replace spark plugs.
Carburetor misadjusted	Adjust carburetor.
Clogged carburetor	Replace carburetor.
Defective spark plug cables	Replace spark plug cables.

81. Oil Pressure Low

Probable cause	*Possible remedy*
Leaking fuel pump	Repair or replace fuel pump.
Defective oil pressure gage	Replace oil pressure gage.

82. Oil Pressure High

Probable cause	*Possible remedy*
Clogged oil passage	Clean all lines and passages.
Oil relief valve stuck	Remove and clean.
Defective oil pressure gage	Replace oil pressure gage.

83. Engine Fails

Probable cause	*Possible remedy*
Defective fuel pump	Replace defective pump.
Defective carburetor	Replace carburetor.

84. Compressor Overheating

Probable cause	*Possible remedy*
Insufficient air circulation around the unit.	Move unit away from any obstructions.
Restricted air intake	Clean or replace air intake.

85. Noisy Compressor Operation

Probable cause	*Possible remedy*
Loose external parts	Tighten loose bolts and screws.
Loose flywheel	Tighten flywheel.

86. Compressor Fails to Operate

Probable cause	*Possible remedy*
Air leaks	Tighten leaking connections and replace defective hoses.
Faulty control valve	Adjust or replace control valve.
Worn out belt	Replace belt.

87. Air Compressor Loses Pressure

Probable cause	*Possible remedy*
Air leaks	Tighten leaking connections and replace defective hoses.
Faulty control valve	Adjust or replace control valve.

88. Lubricant Delivery Faulty

Probable cause	*Possible remedy*
Dirty or sticking control valve.	Clean thoroughly with approved solvent.
Leak in lines	Tighten all connections with couplings. Replace defective hoses.

89. Lubricant Pump Fails to Operate Properly

Probable cause	*Possible remedy*
Faulty connections in grease line.	Inspect line for leaks in hose, swivels, connectors, control handle and pipe line.
Inadequate supply of air	Inspect air connections to pump.

90. Insufficient Pressure or Volume With Pump Operating

Probable cause	*Possible remedy*
Exhausted lubricant supply	Refill lubricant containers.
Circulation of grease	Push grease down around pump intake priming tube and use exhaust to warm grease.

Probable cause	*Possible remedy*
Insufficient air pressure supplied to pump.	If necessary set air regulator to higher pressure. Check for closed or inoperative valves or obstructions.

91. Hose Reels Do Not Turn Properly

Probable cause	*Possible remedy*
Loose mounting	Tighten hose reels at reel hub.
Defective reel brake	Replace the reel brake.

92. Oil Consumption Excessive

Probable cause	*Possible remedy*
Low oil supply	Drain, fill with correct oil.
Leak at air filler cap	Replace oil filler cap.

93. No Brakes or Weak Brakes

Probable cause	*Possible remedy*
Low air pressure	Check the air pressure gage on the towing vehicle. Make leakage tests.
Defective intervehicular hose	Replace the intervehicular air hose.
Defective wheel cylinder hydraulic hoses.	Replace the wheel cylinder hydraulic hose.
Defective air filter	Replace air filter.
Defective emergency valve	Make air operation test of the valve to determine the serviceability. Replace the valve if necessary.
Grease on brake lining	Replace the brakeshoes. Check and replace the oil seal if necessary.
Defective brake air chamber	Make an operation test of the brake air chamber to determine the serviceability. Replace the brake air chamber if necessary.
Defective master cylinder	Replace the master cylinder if necessary.
Defective wheel cylinder	Replace the wheel cylinder.
Worn brake lining	Adjust the brakes or replace the brakeshoe assemblies.
Air in hydraulic lines	Bleed the brakes. Repair all leaks.
Defective air pressure tank	Replace the air pressure tank if necessary.

94. Brakes Will Not Release

Probable cause	*Possible remedy*
Weak or broken brakeshoe retracting springs.	Replace the retracting springs.
Brake valve on towing vehicle in applied position.	Move the brake valve to release position.
Obstructed air and hydraulic tubing or hose.	Inspect the air and hydraulic tubing and hoses for sharp bends or kinks. Replace the intervehicular air hose. Replace the wheel cylinder hose.
Defective exhaust valve	Make an operation test of the exhaust valve to determine the serviceability. Replace the exhaust valve if it is defective.

95. Slow Brake Action

Probable cause	*Possible remedy*
Defective air filters	Replace the air filters if necessary.
Air in hydraulic lines	Bleed the brakes.
Weak or broken brakeshoes retracting springs.	Replace the retracting springs as necessary.
Worn or broken brake air chamber return spring.	Make an operation test of the brake air chamber to determine the serviceability. Replace the air chamber if necessary.
Defective emergency valve	Replace the valve.
Defective master cylinder	Replace the master cylinder.
Defective wheel cylinder	Replace the wheel cylinder.

96. Grabbing Brakes

Probable cause	*Possible remedy*
Grease on brake linings	Replace the brakeshoe assemblies. Inspect and repair oil seal.
Scored or out-of-round brakedrum.	Replace the brakedrum.
Worn or loose brake lining	Replace the brakeshoe assemblies.
Loose or worn wheel bearings	Adjust the bearings. If they cannot be adjusted properly, replace the bearings and cups.

97. Brakes Drag (One or Both Brakes Running Hot)

Probable cause	*Possible remedy*
Brakes adjusted too tight	Adjust the brakes.
Weak or broken brakeshoe retracting springs.	Replace the retracting springs.
Out-of-round brakeshoe	Replace the brakedrum.

98. Excessive or Uneven Tire Wear

Probable cause	*Possible remedy*
Bent wheel	Replace the wheel.
Improper wheel bearing adjustment.	Adjust the wheel bearings.

99. Wheel Wobbles

Probable cause	*Possible remedy*
Loose wheel bearings	Adjust the wheel bearings.
Bent wheel or rim	Replace the wheel.

Probable cause	*Possible remedy*
Worn wheel bearings and cups	Replace the wheel bearings and cups.

100. Wheel Thumps

Probable cause	*Possible remedy*
Bent wheel or rim	Replace the wheel.
Defective tire	Replace the tire.

101. Ineffective Spring and Shock Absorbers Action

Probable cause	*Possible remedy*
Loose U-bolt	Tighten the U-bolt nuts.
Broken spring leaves	Report the deficiency to higher authority for replacement.
Excessive flexibility in springs	Broken spring leaves. Report the deficiency to higher authority for replacement.
Bent or damaged shock absorber.	Replace the shock absorber.
Shock absorber cylinder arm broken.	Replace the shock absorber.

102. Landing Gear Hard to Adjust

Probable cause	*Possible remedy*
Jackscrew threads stripped, outer or inner tube damaged. Thrust bearing worn out, or handle arm assembly bent.	Replace the jack.

103. Lights Flicker or Do Not Light

Probable cause	*Possible remedy*
Short circuit in trailer wiring.	Check the wiring for broken cables or bare spots in the insulation. Replace the wiring harness if necessary.
Burned out bulb	Replace the bulb.
Defective trailer wiring	Replace the wiring harness.

Section VI. RADIO INTERFERENCE SUPPRESSION

104. Definitions

a. Interference. The term "interference" as used herein, applies to electrical disturbances in the radio frequency range which are generated by the lubricating and servicing unit and which may interfere with the proper operation of radio receivers or other electronic equipment.

b. Interference Suppression. The term "interference suppression" as used herein, applies to the methods used to eliminate or effectively reduce radio interference generated by the lubricating and servicing unit.

105. General Methods Used to Attain Proper Suppression

Essentially, suppression is attained by providing a low resistance path to ground for the stray currents. The methods used include shielding the ignition and high-frequency wires, grounding the frame with bonding straps, and using capacitors and resistors. The gasoline engine is equipped with a special shielded and suppressed spark plug and a braided metal sheath over the ignition cable to suppress radio interference. A capacitor is mounted on the generator to suppress high frequency sparking. The starter is bonded to the engine with tooth-type washers. The engine is bonded to the frame of the lubricating and servicing unit with tooth-type washers.

Note. Do not pull on the cable or twist the braided shielding. Gently work the cable from side to side and free the rubber seal. Do not use sharp metal tools to install the rubber seals.

106. Radio Interference Suppression Components

a. Primary Suppression Components. The primary suppression components are those whose primary function is to suppress radio interference. These components are supplied with the engine assembly and are described and illustrated in the applicable engine manuals referenced in appendix I of this manual.

b. Secondary Suppression Components. These components have radio interference suppression functions which are incidental and/or secondary to their primary functions. Tooth-type lockwashers used in securing the engine assembly to the base assembly are secondary suppression components. See that all tooth-type lockwashers used in the securing of any radio suppression components are properly placed and secured.

107. Replacement of Radio Suppression Components

Replace all primary suppression components as instructed in the applicable engine manuals referenced in appendix I.

108. Testing of Radio Interference Suppression Components

Test the capacitors for leaks and shorts on a capacitor tester; replace defective capacitors. If test equipment is not available and interference is indicated, isolate the cause of interference by the trial-and error method of replacing each capacitor in turn until the cause of interference is located and eliminated.

Section VII. FUEL SYSTEM

109. General

The fuel system on the lubrication and servicing unit consists of a ten gallon capacity fuel tank, a connecting fuel line to the diaphragm-type fuel pump, a dry-type air cleaner, a carburetor and a fuel filter. Fuel taken from the fuel source is drawn through the fuel filter by the fuel pump and forced under pressure to the carburetor. The carburetor mixes the fuel with air, drawn through the air cleaner and air cleaner hose, to the proper ratio of air-fuel mixture. The intake manifold assembly disperses the air fuel mixture to the cylinder heads. The air intake pre-heater is used to eliminate carburetor icing conditions and preheat intake air during arctic operation by means of heat radiated by the hot exhaust manifold. The governor assembly operates the governor control rod linkage to the carburetor throttle control valve and controls the engine speed at 3,600 revolutions per minute at full throttle.

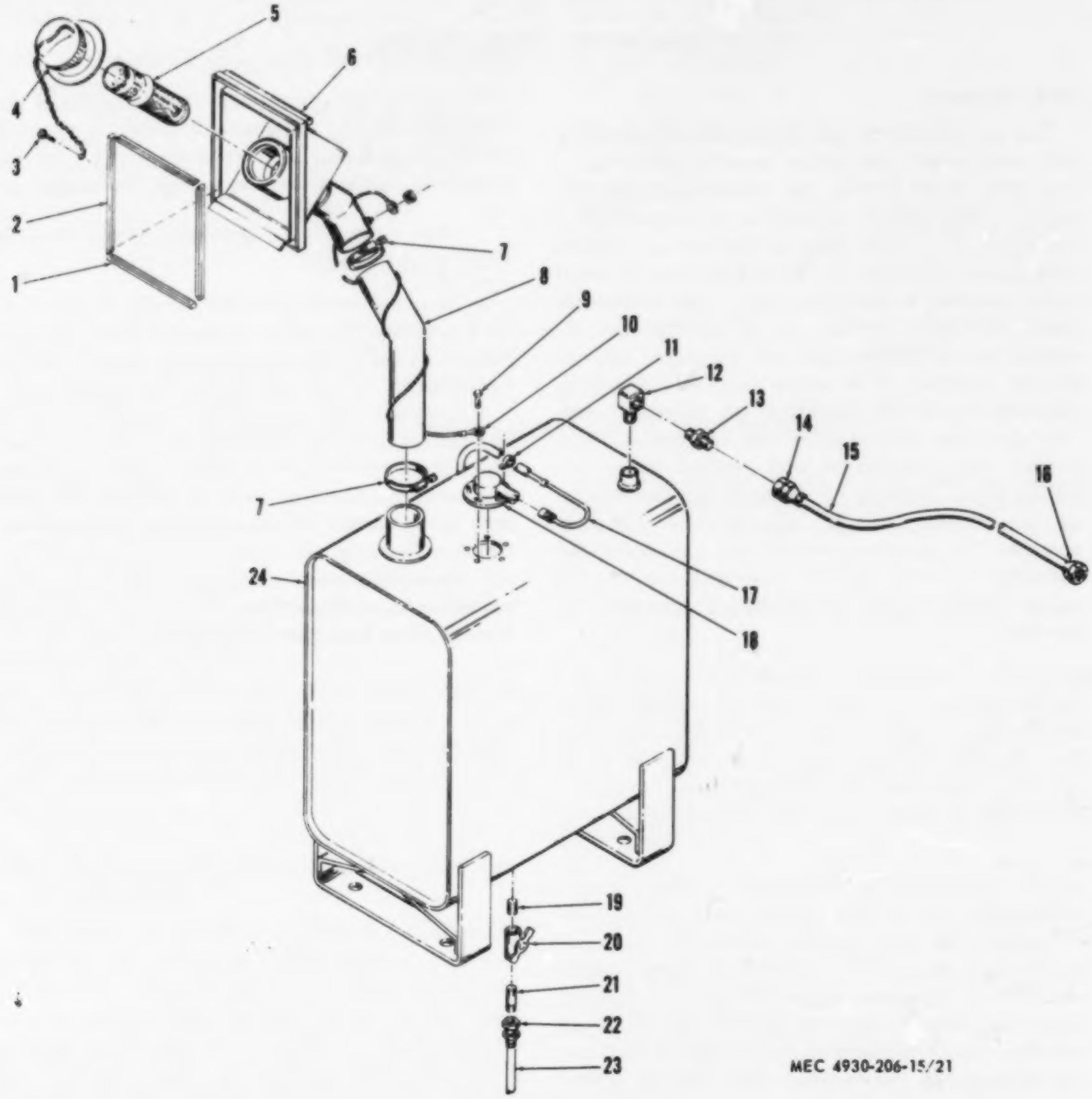
The entire fuel system with the exception of the fuel tank assembly and lines and fittings, is a part of the engine assembly. Refer to Appendix I for the applicable publications concerning the engine asbly.

110. Fuel Strainer

a. Removal and Disassembly. Refer to figure 21 for a complete illustration of the fuel tank, lines and fittings. Unscrew and remove tank cap (4) and pull fuel strainer (5) from within the filler assembly (6).

b. Cleaning and Inspection. Inspect the fuel strainer for clogging, dirt or damage. Using a brush, clean the fuel strainer by submerging in kerosene and flushing. Flush two or three times in clean kerosene to be certain of removing any hardened substance. Brush clean.

c. Reassembly and Installation. Place clean fuel strainer within neck of filler assembly. Replace tank cap (4) on neck of filler assembly.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1	Dust seal (2)
2	Dust seal (2)
3	Sems screw
4	Tank cap
5	Fuel strainer
6	Filler assy
7	Hose clamp (2)
8	Fuel hose
9	Sems screw (5)
10	Static cable
11	Tube clamp
12	90-degree elbow
13	Nipple
14	Hose coupling assy
15	Fuel hose
16	Hose coupling assy
17	Transmitter cable
18	Gage transmitter
19	Tank nipple
20	Drain valve
21	Tank nipple
22	Drain coupling assy
23	Drain hose
24	Fuel tank

Figure 21. Fuel tank assembly and hose.

Section VIII. ENGINE ELECTRICAL SYSTEM

111. General

The 24-volt electrical system consists of a generator, starter, magneto, spark plugs, batteries, high-tension cables and leads. Two 12-volt batteries connected in series are located in the battery box below the rear hoses. The system has a negative ground. Refer to appendix I of this manual for the applicable technical manuals concerning the engine assembly components other than the generator and starter assemblies.

112. Generator

a. Removal. Refer to figure 22 for removal and installation of the generator assembly. Unscrew and remove the attaching parts attaching the unit to brackets (6 and 10). Carefully remove generator drive belts (9, fig. 25) and make electrical disconnections prior to removal.

b. Cleaning and Inspection.

(1) *Cleaning.* Use a clean cloth dampened with dry cleaning solvent to wipe all dust, oil and other foreign material from the brush plates, end frames and armature and field assemblies. Use filtered compressed air to blow all dust and dirt from the crevices of the armature and field windings.

(2) *Inspection.* Inspection procedures are limited to visual checks for loose mounting hardwear, a loose drive belt, damaged wiring, and worn commutator brushes. All mounting bolts should be kept tight and the belt should be adjusted to the proper tension as indicated in *d* below.

c. Testing.

(1) Use a conventional test light and check the field coils for open circuits and shorts to ground or between coils. If coils are defective, replace the generator.

(2) Grounds. Touch one prod of a 110-volt test lamp to the generator commutator and the other test prod to the shaft or laminations. If the lamp lights, the windings are grounded.

d. Installaton.

(1) Installation is the opposite of removal. Refer to figure 22. Be certain to tighten all attaching hardware after belt adjustment. Refer to figure 17, for belt adjustment.

(2) Slightly loosen the mounting bolts for adjusting bolt on the adjusting bracket. Force generator away from the engine until a firm push at a point midway between the two pulleys will depress the belt ½ to ¾-inch. Hold generator in this position and tighten all hardware.

e. Testing (On Engine).

(1) With the generator installed on the engine and electrically connected start the lubricating unit.

(2) Refer to the BAT-GEN indicator (5, fig. 6) for the proper voltage reading. Turn on vehicle lights and accessories to determine if the generator is operating effectively.

113. Starting Motor

a. Removal.

(1) Refer to figure 22 for removal and installation of the starting motor.

(2) Disconnect the starting motor electrically and remove attaching hardware. Carefully pull starter away from flywheel of engine in order not to damage teeth of the starter pinion gear.

b. Cleaning and Inspection.

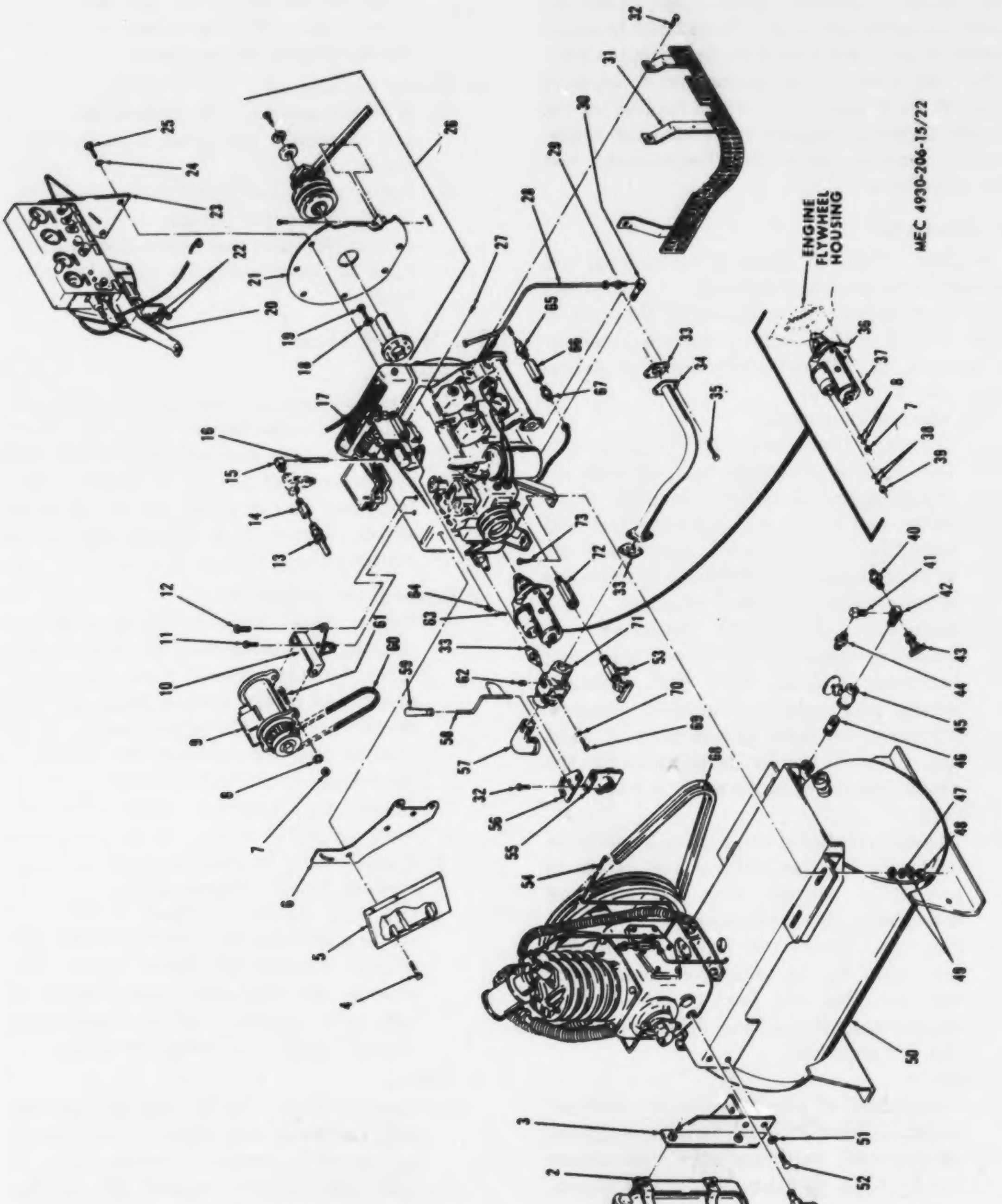
(1) Use a clean cloth dampened with dry cleaning solvent to wipe all dust, oil and other foreign material from the brush plates, end frames and armature and field assemblies. Use filtered compressed air to blow all dust and dirt from the crevices of the armature and field windings.

(2) *Inspection.* Examine motor drive for worn or broken teeth. Check movement of motor drive by rotating pinion and overrunning clutch. Inspect spring for distortion and damage. Check housing for cracks and distortion. Check for damaged wiring. Inspect the starter motor commutator for roughness, out-of-round, or high mica content. Inspect brushes for excessive wear or oil soaked condition.

c. Testing.

(1) *Open circuits.* Use a conventional test light and check field coils for open circuits and shorts to ground or between coils. If coils are defective replace the starting motor.

(2) *Grounds.* Touch one prod of a 110-volt test lamp to the starter motor commutator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ENGINE FLYWHEEL HOUSING
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Figure 22. Engine and compressor assembly.

INDEX TO FIGURE 22

1	Fire extinguisher
2	Hex head screw (2)
3	Fire extinguisher bracket
4	Hex head screw (3)
5	Belt guard
6	Adjusting bracket
7	Hex nut
8	Lock washer (2)
9	Generator assy
10	Generator bracket
11	Hex head screw
12	Hex head screw
13	Fuel hose assy
14	Hose adapter
15	90-degree elbow
16	Nipple
17	Engine assy
18	Lock washer (5)
19	Hex head screw (5)
20	Hex nut
21	Flywheel cover
22	Lock washer (2)
23	Control panel assy
24	Lock washer (8)
25	Hex head screw (8)
26	Clutch assy
27	Hex head screw (2)
28	Oil pressure tube
29	Connector
30	90-degree elbow
31	Exhaust guard
32	Hex head screw (6)
33	Gasket (3)
34	Exhaust tube
35	Hex head screw (4)
36	Starting motor assy
37	Hex head screw (2)
38	Lock washer
39	Hex nut
40	Straight fitting
41	Pipe fitting
42	Pipe fitting
43	Drain cock
44	Straight fitting
45	Master valve
46	Pipe nipple
47	Lock washer (4)
48	Hex nut (5)
49	Lock washer (9)
50	Compressor assy
51	Lock washer (2)
52	Hex head screw (5)
53	Drain valve (2)
54	Air tube
55	Exhaust manifold cap
56	Deflector latch
57	90-degree elbow
58	Exhaust deflector
59	Deflector handle
60	Drive belt
61	Hex head screw (3)
62	Pipe plug
63	Setscrew
64	Throttle control arm
65	Temperature transmitter
66	Tee assy
67	Hose adapter
68	Drive belt
69	Hex head screw (2)
70	Lock washer (2)
71	Exhaust housing
72	Oil drain adapter
73	Hex head screw (4)

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and the other prod of the shaft. If the lamp lights, the windings are grounded.

d. Installation. Installation is the opposite of removal. Refer to figure 22. Secure all attaching hardware after final installation. Be extremely careful to align pinion gear of starter motor with teeth of the engine flywheel.

Section IX. ENGINE COOLING SYSTEM

114. General

The cooling system of the military standard engine enables the engine to operate satisfactorily in temperate, desert, arctic, and tropical environments. Air drawn into the system through the winterization shroud and screen or the flywheel housing and dispersed by the flywheel fan into and around the cylinder covers, internal covers, cylinder baffles, cylinder heads, oil pan cover and roof. Refer to appendix I for the applicable manuals to explain and instruct maintenance of the engine assembly cooling system.

Section X. ENGINE LUBRICATING SYSTEM

115. General

Lubricating oil on the military standard engine is drawn from the crankcase oil pan by the oil pump and forced through the full-flow oil filter into the drilled galleries of the crankcase and fed, under pressure, to the moving engine components. Excess oil from the rocker arms is returned to the crankcase oil pan by means of the rocker arm drain tubes. The oil level gage rod enables the operator to maintain the crankcase oil at the proper level. The system consists of the oil level gage rod, rocker arm drain tubes and compression sleeves, oil pan, oil pump and filter. Refer to appendix I for the applicable maintenance manuals for the engine assembly.

116. Oil Pressure Gage

a. Removal.

(1) Refer to figure 23 for removal of the oil pressure gage (12).

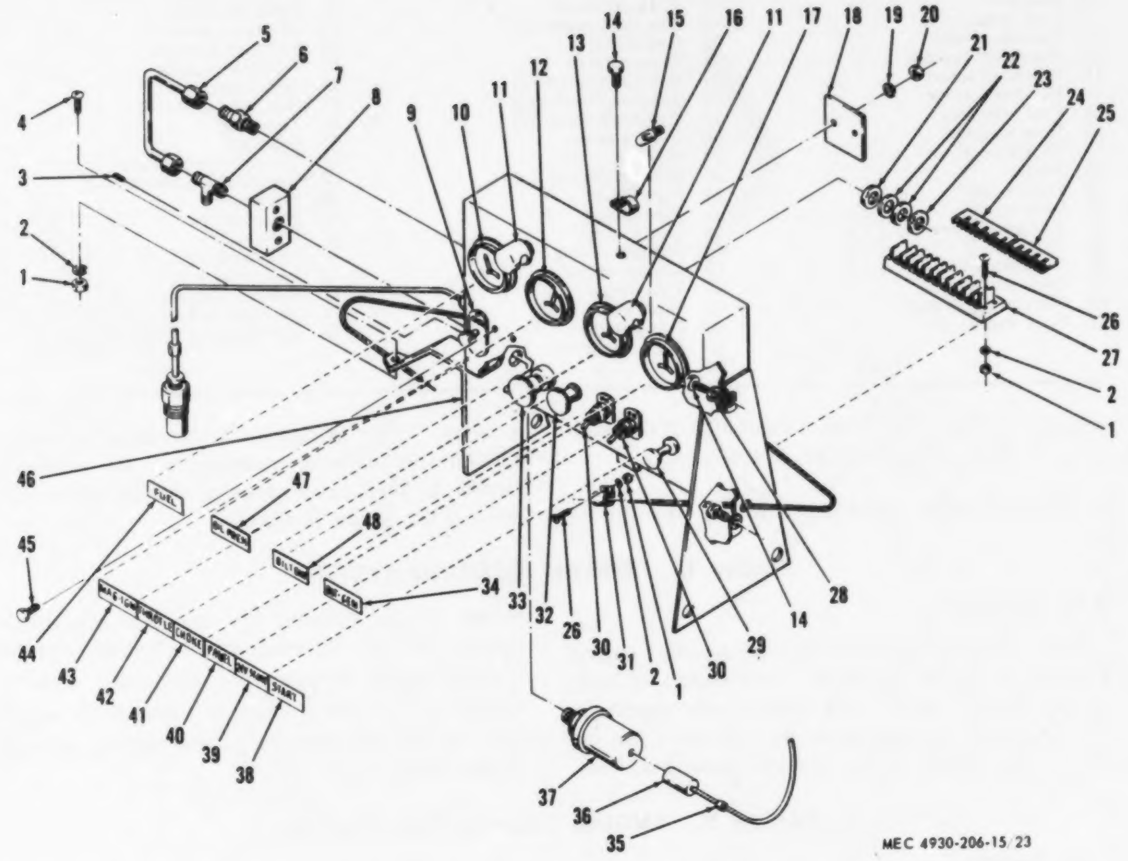
(2) Unscrew and remove the attaching hardware and shock mount at rear of the lubricator panel.

(3) Remove the electrical connections to the wire assembly and carefully pull the oil pressure gage out of the panel.

b. Cleaning and Inspection.

(1) *Cleaning.* Carefully clean the entire oil pressure gage with a cloth moistened in drycleaning solvent. Wash the glass with a mild solution of warm soap and water. Dry the glass with a clean lint-free cloth.

(2) *Inspection.* Inspect the oil pressure gage for a cracked or broken glass, missing hardware and broken or bent terminals.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OIL PRESS
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OIL TEMP
BAT-GEN
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MAG-IGN
THROTTLE
CHOKE
PANEL
24V START
START
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32
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1	Hex nut (6)
2	Lock washer (6)
3	Setscrew
4	Round head screw (2)
5	Tube assy
6	Connector
7	Tee
8	Manifold
9	Magneto-ignition control
10	Fuel gage
11	Dash panel lamp (2)
12	Oil pressure gage
13	Temperature gage
14	Cap screw (6)
15	Bulb (2)
16	Cable clamp (4)
17	Bat-Gen gage
18	Switch spacer
19	Lock washer (2)
20	Hex nut (2)
21	Lock nut
22	Lock washer (2)
23	Electrical adapter
24	Contact strip
25	Contact strip
26	Round head screw (4)
27	Terminal strip
28	Lock washer
29	Starter switch
30	Toggle switch (2)
31	Cable clamp (2)
32	Choke control
33	Throttle control
34	Bat-Gen lable
35	Marker
36	Wire assy
37	Sending unit
38	Start label
39	Start label (24-volt)
40	Panel label
41	Choke label
42	Throttle label
43	Magneto-ignition label
44	Fuel label
45	Cap screw (2)
46	Control panel
47	Oil pressure label
48	Oil temperature label

Figure 23. Control panel assembly.

Section XI. ENGINE EXHAUST SYSTEM

117. General

The exhaust system of the engine assembly consists primarily of exhaust manifolds, preheaters and associated equipment. Refer to Appendix I and the listed technical manuals for the engine assembly, for complete coverage of the engine exhaust system.

Section XII. CONTROLS AND INSTRUMENTS

118. General

The operating controls and instruments of the lubricating and servicing unit are illustrated in figure 23. The instruments and controls consists of the fuel gage, two panel lights, oil pressure gage, oil temperature gage, battery-generator gage, starter button, 24-volt start switch, panel light switch, choke control, throttle control, throttle control and magneto ignition control.

119. Fuel Gage

a. Removal.

(1) Refer to item 10, figure 23, for removal of the fuel gage. Unscrew and remove attaching parts and shock mount securing gage at rear of panel.

(2) Disconnect the gage electrically and remove.

b. Cleaning and Inspection.

(1) Clean the face of the gage with a mild soap-water solution and wipe dry with a clean lint-free cloth.

(2) Inspect the gage for missing or cracked glass and bent or damaged hardware or terminals.

c. Installation.

(1) Installation is the reverse of removal.

(2) Be certain attachment is secure and the gage is straight in the panel. Attach wiring leads.

120. Magneto-Ignition Control

a. Removal.

(1) Refer to item 9, figure 23, for removal of the magneto-ignition control.

(2) Disconnect tubing and cabling to the control. Remove attaching parts and carefully pull knob from front of control.

(3) Remove attaching parts (19 and 20) at rear of panel and remove control.

b. Cleaning and Inspection.

(1) Carefully clean the control with clean cloths moistened in dry cleaning solvent.

(2) Inspect all fittings for stripped or cross-threads. Inspect tubing for breaks or cracks.

c. Installation.

(1) Installation is the reverse of removal. Refer to figure 23.

(2) Position the control (9) and install with screws (45), washers (19), nuts (20) and spacer (18). Attach the fittings at the engine assembly.

121. Dash Panel Lamps

a. Removal.

(1) Disconnect the two dash panel lamps (11, fig. 23) at the rear of the panel.

(2) Unscrew and remove the attaching hardware at the rear of the panel and pull the panel lights forward and out of the hole provided.

b. Cleaning and Inspection.

(1) Carefully wipe the complete dash panel light with soft cloths moistened in dry cleaning solvent. Wipe dry with clean lint-free cloths.

(2) Inspect the panel lamps for broken or burned out bulbs, bent contacts or stripped and crossed threads on attaching parts.

c. Installation.

(1) Installation of the two dash panel lamps is essentially the reverse of removal.

(2) Refer to figure 23 and install the lamps (11). Tighten the attaching parts securely from the back of the panel and connect electrically.

122. Oil Pressure Gage

a. Removal.

(1) Remove the oil pressure gage (12, fig. 23) by first disconnecting the gage electrically at the rear of the control panel.

(2) Remove the attaching parts and the shock mount and carefully pull the gage out from the panel.

b. Cleaning and Inspection.

(1) Clean the face of the gage with a mild soap-water solution and wipe dry with a clean lint-free cloth.

(2) Inspect the gage for missing or cracked glass and bent or damaged hardware or terminals.

c. Installation.

(1) Installation is the reverse of removal.

(2) Be certain the gage is square in the panel and attachment is secure. Connect the gage electrically.

123. Temperature Gage

a. Removal.

(1) Refer to item 13, figure 23, for removal of the temperature gage. Unscrew and remove attaching hardware and shock mount securing the gage to rear of panel.

(2) Disconnect the gage electrically and remove from panel.

b. Cleaning and Inspection.

(1) Clean the face of the gage with a mild soap-water solution and dry with a clean lint-free cloth.

(2) Inspect the gage for a missing or cracked glass, and bent, missing or damaged hardware and terminals.

c. Installation.

(1) Installation is the reverse of removal.

(2) Be certain attachment is secure and the gage is straight in the panel. Attach wiring leads to back of gage.

124. BAT-GEN Gage (Ammeter)

a. Removal.

(1) Refer to item 17, figure 23, for removal of the BAT-GEN gage. Unscrew and remove the attaching hardware and shock mount from the rear of the panel.

(2) Disconnect the gage electrically and remove the rear of the panel.

b. Cleaning and Inspection.

(1) Clean the gage face with a mild solution of soap-water solution and wipe the entire gage clean with a lint-free cloth.

(2) Inspect the gage for a cracked or broken face and missing or damaged hardware and terminals.

c. Installation.

(1) Installation is the reverse of removal.

(2) Be certain attachment of gage is secure and that gage is upright in panel. Attach wiring leads from back of panel.

125. Starter Switch

a. Removal.

(1) Refer to item 29, figure 23, for removal of starter switch.

(2) Disconnect the switch electrically at the rear of the panel. Remove the attaching nut and lockwasher and pull switch outward from the front of the panel.

b. Cleaning and Inspection.

(1) Carefully wipe the switch clean with a lint-free cloth moistened in dry cleaning solution.

(2) Inspect the switch for smooth action and missing or damaged attaching hardware or terminals.

c. Installation.

(1) Installation is the reverse of removal.

(2) Place the switch in the panel and secure with the lockwasher and nut supplied. Connect the switch electrically.

126. Toggle Switch

a. Removal.

(1) Removal of both toggle switches (30, fig. 23) is identical. Disconnect the switch electrically and remove the attaching hardware from each switch at the front of the panel.

(2) Slide the switches from the panel and out the rear of the panel.

b. Cleaning and Inspection.

(1) Carefully wipe both switches clean with a lint-free cloth moistened with dry cleaning solution. Wipe the switches dry.

(2) Inspect both switches for smooth action and missing or damaged attaching parts and terminals.

c. Installation.

(1) Installation is the reverse of removal.

(2) Position both switches in the panel from the rear and secure with the required attaching parts. Connect the switches electrically.

127. Choke Control

a. Removal.

(1) Disconnect the choke control (32, fig. 23) cable from the carburetor of the engine assembly.

(2) Unscrew the attaching nut and lock washer at the rear of the panel and slide parts over end of loosened cable. Pull the choke control and attached cable out and through the front of the panel.

b. Cleaning and Inspection.

(1) Clean the choke control and cable by wiping with a cloth moistened in dry cleaning solution.

(2) Insert the choke control for smooth action by pulling and pressing in on the knob. Inspect cable for extreme bends or wear.

c. Installation.

(1) Insert cable of choke control through hole on outside face of panel. Press the choke control firmly against panel and slide attaching parts up over cable to back of panel. Secure choke control to panel.

(2) Attach loose end of cable to carburetor being certain not to restrict cable by bending too sharply.

128. Throttle Control

a. Removal.

(1) Disconnect the cable of the throttle control (33, fig. 23) at the engine assembly. Unscrew the attaching nut and washers and slide them down over the cable from the rear of the panel.

(2) Carefully pull the throttle control out from the front of the panel being certain not to bend the cable at too sharp an angle.

b. Cleaning and Inspection.

(1) Clean the throttle control and cable by wiping with a cloth moistened in dry cleaning solvent.

(2) Inspect the throttle control for smooth action by pulling and pushing the knob in and out. Check for extreme bends in the cable as well as wear.

Section XIII. ENCLOSURE ASSEMBLY

129. General

The enclosure assembly, figure 24, consists of the front and rear door assemblies and two identical side door assemblies. Each door assembly consists of two panels with latches for attaching open and two slide locking devices. The enclosure itself is provided with two hand lifting devices, one at each side corner.

130. Enclosure Assembly

a. Removal.

(1) Unscrew and remove the four lifting rings (fig. 3) at the top of the enclosure assembly.

(2) Using the four hand lifting devices, carefully lift the enclosure assembly up and over the lubricator internal equipment and off of the frame.

b. Installation.

(1) Carefully lift the enclosure assembly up and over the lubricator unit, being certain to align the enclosure assembly with the frame.

(2) Lower the enclosure in position aligning holes provided for lifting rings.

(3) Install the lifting rings in position and tighten.

131. Doors

a. Removal.

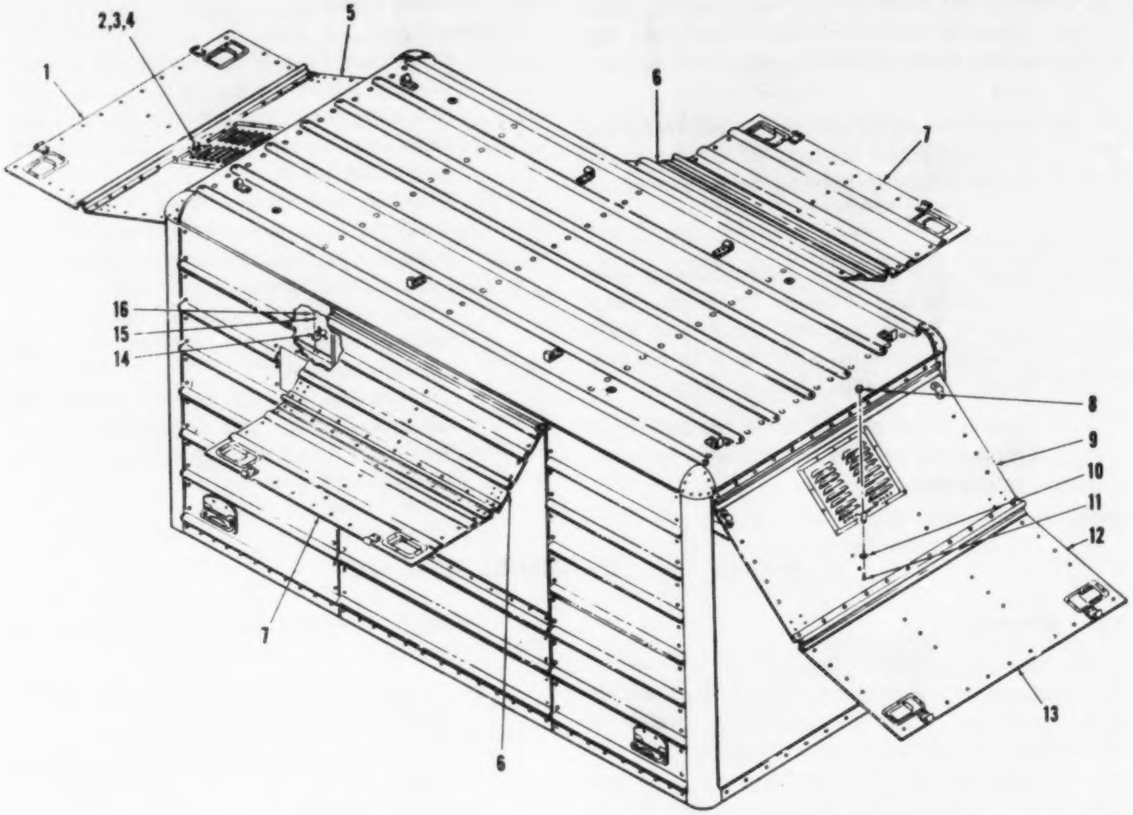
(1) In the event removal of a door is necessary, knock pins provided with the attached hinges loose and pull from hinge.

(2) Be extremely careful when removing pin to avoid bending.

b. Installation.

(1) Position the door against the enclosure carefully aligning the hinge halves.

(2) Insert the hinge pin in position.



MEC 4930-206-15/24

1 Panel
2 Knob
3 Lock washer
4 Round head screw
5 Panel
6 Panel (2)
7 Panel (2)
8 Knob
9 Panel
10 Lock washer
11 Round head screw
12 Double door assy
13 Panel
14 Latch assy
15 Lock washer
16 Round head screw

Figure 24. Enclosure assembly.

Section XIV. CLUTCH ASSEMBLY

132. General

The clutch assembly consists of clutch retainer, clutch shaft and the clutch, as well as the attaching parts. The clutch is made up of center, end and sliding clutch disks and operates as a variable speed pulley. The clutch is hand operated by means of the fork handle.

133. Clutch Assembly

a. Removal.

(1) The clutch assembly (16, fig. 22) is readily removable from the lubricator unit. Unscrew the cap screw at the outer end of the clutch assembly (away from engine) and remove the lock washer and clutch retainer.

(2) Remove the cotter pin and rivet attaching the handle to the flywheel cover at the handle pivot point. Slide the clutch out from the clutch shaft.

b. Cleaning and Inspection.

(1) Clean the clutch by flushing in kerosene several times, Blow dry with clean filtered compressed air.

(2) Inspect clutch balls for wear or flattening. Inspect entire clutch for damaged or worn parts.

c. Installation.

(1) Installation is the reverse of removal. Align the clutch on the clutch shaft and press into position towards the flywheel cover. Secure the clutch in position with the clutch retainer, lockwasher and cap screw.

(2) Secure the clutch handle at its pivot point with the rivet and cotter pin.

134. Clutch Adjustment

No adjustment of the clutch is possible other than belt alignment. Align belts so they are IN-LINE with opposite pulley when clutch is disengaged. Belt should drive slightly OUT-OF-LINE when clutch is engaged. This alignment is necessary if belt "creeps" when de-clutched.

Section XV. AIR SYSTEM

135. General

The compressor on the lubricating unit is a two stage, 16 cfm unit, with a disk type valve system. The twin-cylinder construction gives a higher discharge pressure with less consumption of power. The larger cylinder is the low pressure cylinder and the smaller is the high pressure cylinder. The low pressure, or first stage, exhausts air into an intercooler which cools the air before it enters under pressure (45 psi) into the high pressure cylinder. The compressor is equipped with an oil monitor which affords maximum protection against damage due to insufficient oil in the crankcase, however the splash-type lubrication system provides adequate lubrication, even if the oil level in the reservoir is low. The compressor is equipped with an automatic pressure control which unloads the compressor when the tank pressure has reached 175 psi, and allows compression to resume when pressure has dropped to 145 psi. A centrifugal unloader automatically opens a valve releasing compression from cylinders, inter-cooler and after-cooler each time the compressor stops. Air is exhausted outside the crankcase where moisture cannot contaminate the lubricant.

136. Compressor Air Cleaner

a. Removal.

(1) Refer to figure 20, for removal of the compressor air cleaner.

(2) Remove tube (11) from air cleaner assembly (10). Unscrew and remove setscrew (9) and lift air cleaner from compressor assembly.

b. Disassembly.

(1) Unscrew and remove screw (3) attaching cover (4). Remove cover.

(2) Lift filter element (2) from inside air cleaner assembly (10).

c. Clean and Inspect.

(1) Clean all parts, using an approved cleaning solvent. Make sure all dirt, grime and lint is removed from the filter element. Blow out the filter element using dry, filtered, compressed air.

(2) Inspect the filter tank for breaks or damage. Inspect the filter for damage or excessive wear. Check threads of acting hardware for damaged or crossed threads.

d. Reassembly.

(1) Install filter element (2) inside the air cleaner assembly tank and secure cap (4) to tank with screw (3).

(2) Place air cleaner assembly on compressor head aligning mounting hole. Install setscrew (9) and tighten. Replace tube (11).

137. Compressor Drive Belt Guard

a. Removal.

(1) The compressor drive belt guard (1, fig. 10) is located between the engine and compressor assembly and the reel bank assembly.

(2) Unscrew and remove the cap screws, flat washers, lockwashers and nuts attaching the guard in two places to the frame assembly. Carefully pull the guard up and off the belt.

b. Clean and Inspect.

(1) Wipe the belt guard clean with a cloth moistened in dry cleaning solvent. Scrape off any accumulation of caked dirt or oil.

(2) Inspect the belt guard for dents or misalignment. Inspect attaching parts for cross threads.

c. Installation.

(1) Installation is the reverse of removal. Carefully align the attaching holes and install attaching parts.

(2) Be extremely careful to align belt guard over belt to avoid rubbing or wear to belt.

138. Compressor Drive Belt

a. Removal.

(1) Loosen the attaching parts (10, fig. 25) attaching the engine assembly (1) to the base.

(2) Slide the engine assembly (1) towards the compressor assembly (4) only enough to loosen drive belts (9). Remove belts.

b. Inspect. Inspect the compressor drive belts for excessive oil soaking, rips or worn and frayed spots. Replace belts if necessary.

c. Installation.

(1) Position drive belts over clutch and compressor drive pulley.

(2) Slide engine assembly away from compressor assembly to tighten belts and obtain proper tension. Tighten engine assembly to base attaching parts.

(3) Check belt tension. Proper tension is indicated when belts can be depressed approximately ½ to ¾ inch.

139. Compressor Drive Pulley

a. Removal.

(1) With belt guard and drive belts removed, loosen and remove pulley attaching parts (7, fig. 25).

(2) Slide the drive pulley (6) from the end of the keyed compressor shaft. Remove the key from the shaft.

b. Clean and Inspect

(1) Clean the compressor drive pulley with a cloth moistened in dry cleaning solvent. Wipe dry and remove any oil or grease from the belt surface.

(2) Inspect the compressor drive pulley for cracks or burrs. Replace a defective pulley.

c. Installation.

(1) Install the key in the compressor drive shaft. Press the drive pulley over the shaft and key. Do not force the pulley on shaft. Be certain of alignment.

(2) With holes aligned, install the attaching bolt and nut through the drive pulley and drive shaft. Tighten attaching parts.

140. Compressor Relief Valve

a. Removal. Using a wrench, unscrew and remove relief valve (8, fig. 25).

b. Clean and Inspect.

(1) Wipe the exterior of the relief valve with a cloth moistened in dry cleaning solvent.

(2) Inspect the relief valve for worn or damaged parts. If damaged or worn, replace the valve.

c. Installation. Carefully screw the relief valve into the fitting as indicated in figure 25.

141. Hoses, Lines and Fittings

a. Removal.

(1) Remove tubing (3, fig. 25) and hoses (5) from the compressor assembly.

(2) Remove all fittings and relief valve (8) from the compressor assembly.

(3) Remove tubing from the compressor to the air storage tank.

b. Clean, Inspect and Repair.

(1) Remove all dirt and grease accumulations from the intercooler and aftercooler tubes. Be certain there is no foreign material coating the tubes which could hamper or obstruct the cooling function.

(2) Clean all fittings with an approved dry cleaning solvent. Wipe clean with dry lint-free cloths.

(3) Inspect all tubing and hoses for cracks, dents or leaks which would impair their function.

(4) Inspect all fittings and elbows for damaged threads, external damage, or internal obstructions.

(5) Do not attempt repair on tubes, hoses or fittings. Replace all worn or damaged parts.

c. Installation. Install all tubes, hoses and fittings in the reverse sequence of their removal. Refer to figure 25.

142. Centrifugal Unloader Valve

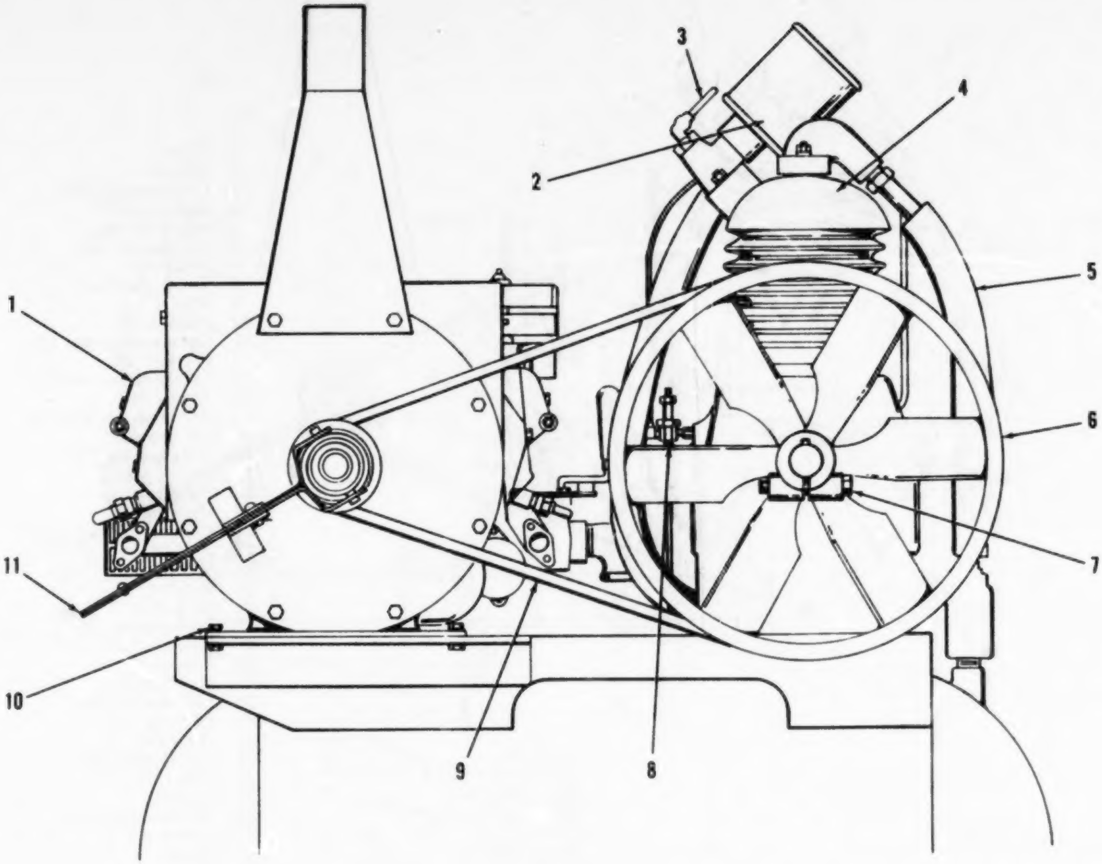
a. Removal.

(1) Refer to figure 26, for removal of the unloader valve.

(2) Unscrew and remove six screws (82). Pull cover (81) and gasket (80) away from housing (99). Remove components of unloader valve.

b. Disassemble.

(1) Unscrew and remove nut (86), spring (87), ball (88) and valve body (89) from cover (93). Remove gasket (90), plunger (91) and sleeve (92) from cover.



MEC 4930-206-15/25

1 Engine assembly
2 Air filter
3 Tubing
4 Compressor assembly
5 Hose
6 Drive pulley
7 Drive pulley bolt and nut
8 Relief valve and fittings
9 Drive belts
10 Engine assembly nut, washers and screw
11 Clutch assembly

Figure 25. Compressor drive belt removal and installation.

(2) Remove sleeve (94), spring (95), and spring plate (78). Unscrew and remove hex head screw (77) releasing internal parts of unloader valve.

(3) Pull pins (96) releasing two weights (76) from spindle (97). Remove springs (75) and washer (98).

c. *Cleaning and Inspection.*

(1) Clean all parts except gaskets in an approved cleaning solvent.

(2) Inspect all threaded parts for stripped or crossed threads. Inspect castings for warped condition or damage. Inspect springs for fatigue or damage. Replace all questionable parts with new ones at reassembly.

d. *Reassembly.* Reassembly is the opposite of disassembly.

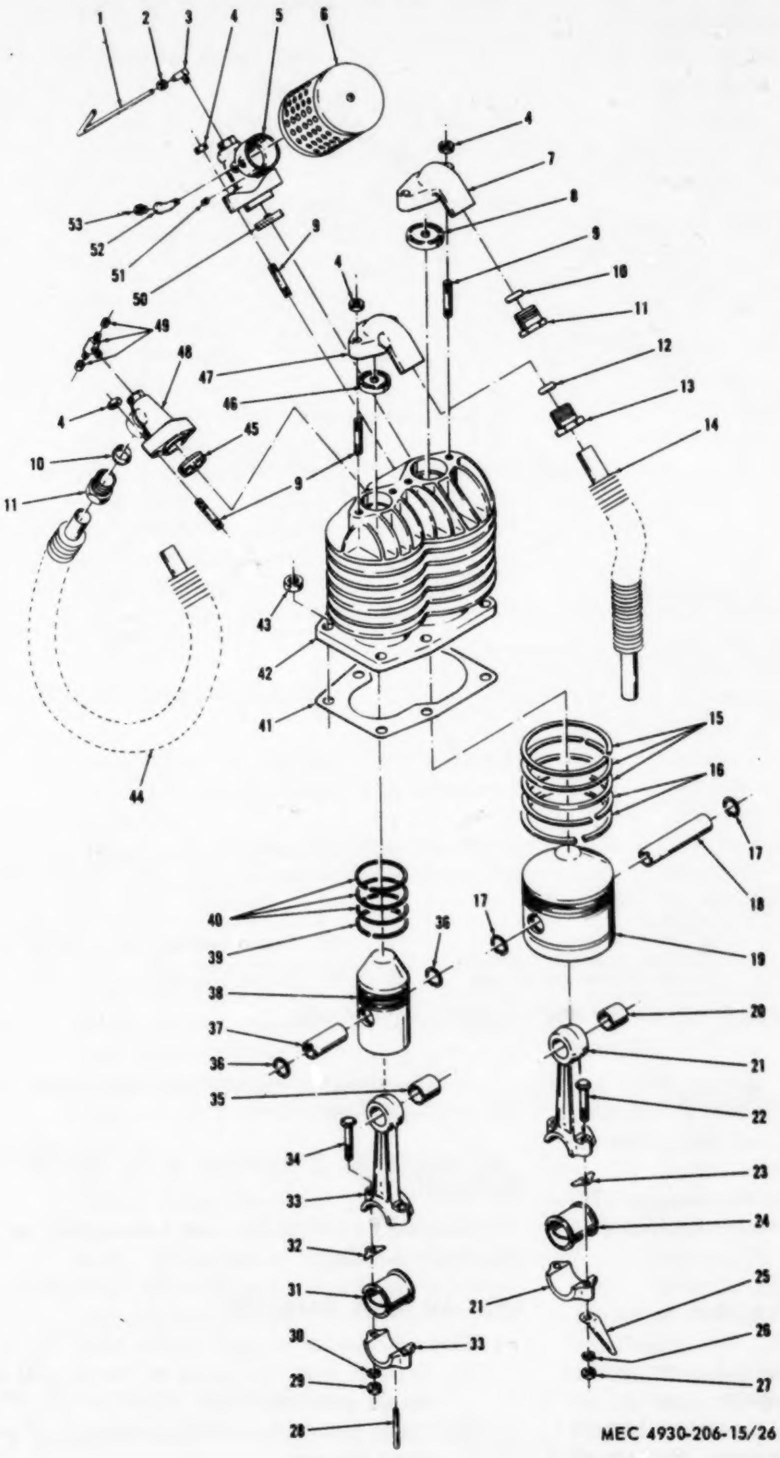
e. *Installation.* With the unit reassembled, it is completely installed.

143. Air Gage Assembly

a. *Removal.*

(1) Refer to item 108, figure 26, for removal of the air gage assembly.

(2) Using a wrench carefully unscrew and remove the gage.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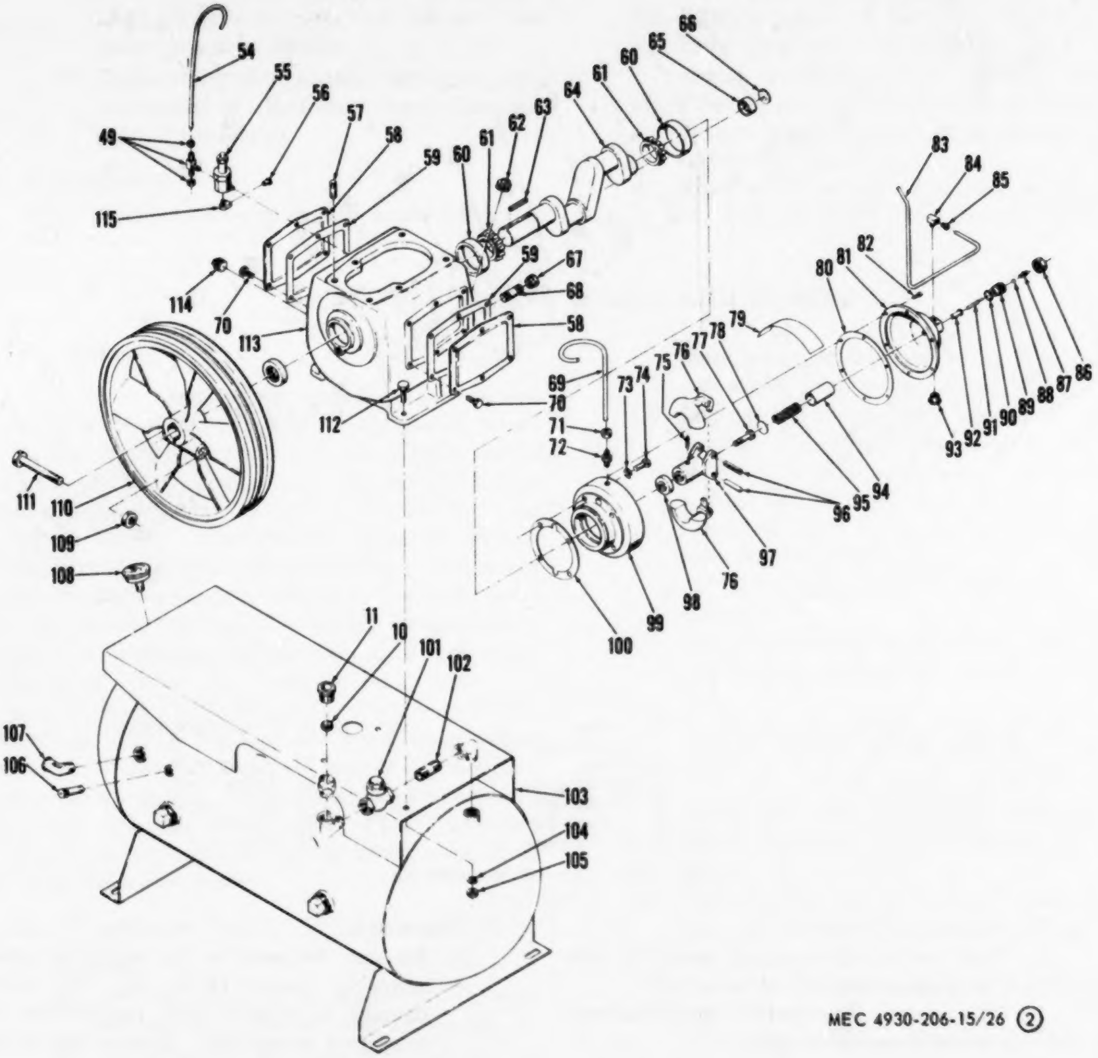
MEC 4930-206-15/26 ①

1	Tube
2	Fitting
3	Compression nut
4	Hex nut (8)
5	Manifold assy
6	Air cleaner assy
7	Manifold
8	Valve assy
9	Stud (8)
10	Ferrule (2)
11	Compression nut (2)
12	Ferrule (2)
13	Compression nut (2)
14	Tube
15	Compression ring (3)
16	Oil ring (2)
17	Retainer ring (2)
18	Piston pin
19	Piston
20	Bushing
21	Connecting rod
22	Bolt (2)
23	Shim (2)
24	Bearing
25	Oil scoop
26	Lockwasher (2)
27	Hex nut (2)
28	Slinger
29	Hex nut (2)
30	Lockwasher (2)
31	Bearing
32	Shim (2)
33	Connecting rod
34	Bolt (2)
35	Bushing
36	Retainer ring (2)
37	Piston pin
38	Piston
39	Oil ring
40	Compression ring (3)
41	Gasket
42	Cylinder
43	Hex nut (6)
44	Intercooler tube
45	Valve assy
46	Valve assy
47	Manifold
48	Manifold
49	Tee and nuts assy (3)
50	Valve assy
51	Setscrew
52	Compression elbow
53	Compression nut (2)
54	Tube
55	Valve assy
56	Compression nut
57	Stud (6)
58	Plate (2)
59	Gasket (2)
60	Bearing cup (2)
61	Bearing cone (2)
62	Pipe plug
63	Key

Figure 26. Compressor assembly.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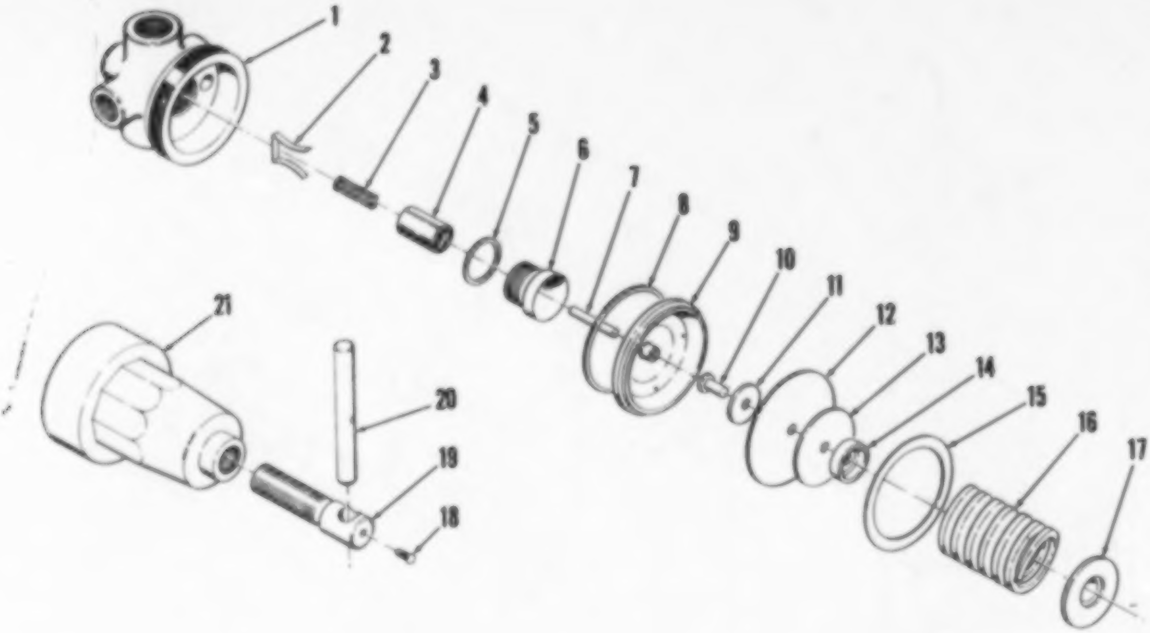
MEC 4930-206-15/26 ②

64 Crankshaft
65 Seal
66 Oil gage
67 Cap
68 Nipple
69 Tube
70 Hex head screw (12)
71 Compression nut
72 Fitting
73 Lockwasher
74 Hex head screw (4)
75 Spring (2)
76 Weight (2)
77 Hex head screw
78 Plate
79 Baffle plate
80 Gasket
81 Cover
82 Screw (6)
83 Tube
84 Fitting
85 Compression nut (2)
86 Nut
87 Spring
88 Ball
89 Valve body
90 Gasket
91 Plunger
92 Sleeve
93 Muffler
94 Sleeve
95 Spring
96 Weight pin (2)
97 Spindle
98 Washer
99 Housing
100 Gasket set
101 Valve assy
102 Pipe nipple
103 Air receiver tank
104 Lock washer (4)
105 Hex nut (4)
106 Safety valve
107 Street elbow
108 Air gage
109 Hex nut
110 Flywheel
111 Hex head bolt
112 Hex head screw (4)
113 Crankcase
114 Pipe plug
115 Fitting

Figure 26—Continued.



MEC 4930-206-15/27

1	Body
2	Valve spring
3	Spring
4	Regulator
5	Gasket
6	Valve seat
7	Pin
8	Gasket
9	Baffle plate
10	Rivet
11	Spring guide
12	Diaphragm
13	Support plate
14	Spring guide
15	Diaphragm washer
16	Spring
17	Spring plate
18	Drive screw
19	Adjusting screw
20	Handle
21	Cap

Figure 27. Air regulator assembly.

b. Cleaning and Inspection.

(1) Wash the face of the air gage assembly with a mild soap-water solution and dry.

Caution: **Be extremely careful to keep water from inside gage.**

(2) Inspect the gage assembly for a cracked or broken face, illegible marking and other damage.

144. Air Pressure Regulator Valve

a. Removal.

(1) The three air pressure regulator valves (1, fig. 7) are located directly above the reel bank assembly.

(2) Unscrew and remove the hoses leading to the valves. Unscrew and remove the individual pump pressure gages from each valve. Carefully remove the gages by unscrewing from the pipe fittings.

b. Disassembly.

(1) Do not disassemble the regulator screw assembly (items 18–21, fig. 27) unless damage is evident and replacement of some part is required. Remove the entire screw assembly from body (1).

(2) Remove spring plate (17), spring (16), washer (15) and the diaphragm assembly from inside body (1). Disassemble the diaphragm assembly by removing rivet (10) and the balance of the parts (11, 12, 13 and 14) will come apart.

(3) Remove baffle plate (9), gasket (8), valve seat (6), gasket (5), valve (4), spring (3) and valve spring (2) from inside body (1).

c. Cleaning, Inspection and Repair.

(1) Clean all metal parts of the air regulator valve assembly in dry cleaning solvent.

(2) Inspect the air regulator valve for damage to threaded areas, cracks or warping. Inspect all parts for wear and damage. Inspect springs for fatigue.

(3) Replace all gaskets and the diaphragm prior to reassembly. Replace or repair threaded parts if required.

d. Reassembly.

(1) Position valve spring (2) inside body (1). Install spring (3), valve (4), gasket (5), valve seat (6) and pin (7).

(2) Position gasket (8) on body (1). Install baffle plate (9). Assemble diaphragm assembly (items 10–14) and install in body.

(3) Place diaphragm washer (15) against diaphragm assembly and install spring (16) and spring plate (17).

(4) Screw adjusting screw assembly (items 18–21) over assembled parts and on body (1).

Section XVI. TRAILER WHEELS AND BRAKES

145. General

The major components comprising this section are the side rings, tire and tube, wheels, wheel bearings (both cone and cup), wheel hubs, brake drums and brake assemblies. The service brakes are of the type known as "air over hydraulic." Air pressure is used to operate the hydraulic braking mechanisms, applying the brakes with pressure in ratio to the foot pressure applied to the brake pedal of the towing vehicle. The trailer service brakes consist of intervehicular air hoses, air filters, relay-emergency valve, air pressure tank, brake air chamber, master cylinder, wheel cylinders, hydraulic lines and fittings, and air lines and fittings. Each wheel brakeshoe is anchored loosely to the back plate, on which it is allowed to expand and contract without binding. Hydraulic wheel cylinders mounted at the top and bottom actuate the shoes during braking operation.

146. Wheel and Tire

a. Removal.

(1) Jack up wheel to be removed. Unscrew and remove six wheel nuts (16, fig. 28).

(2) Pull wheel and tire from over hub (7).

b. Disassembly.

(1) Remove valve cap (20) and valve stem (21) from the tube assembly (17). Let air out of tire and tube.

(2) Using pry iron remove side ring (19) from over tube.

Caution: **Under no circumstances remove side ring without first letting all air out of tire and tube.**

(3) Remove tire and tube from wheel (15) and then remove tube (17) from tire (18).

c. Cleaning, Inspection and Repair.

(1) Clean dirt and grime from wheel, tire, inner tube and side ring by washing parts with clean, fresh water. Wipe dry.

(2) Inspect the inner tube for worn spots, cuts, scrapes, or deterioration. Inspect the tire for foreign objects embedded in the rubber, and for cuts, bruises, or severe wear.

(3) Clean the inside of tire with a dry cloth or blow out dirt with compressed air. If any part is defective, repair or relpace it.

d. Reassembly.

(1) Install valve core (21, fig. 28) in tube (17). Inflate tube slightly and install it in tire (18).

(2) Lay the wheel (15) flat on the ground with mounting holes up. Position inner tube valve stem in slot on wheel and slide tire in position. The valve stem should point toward the outer, or mounting side, of the wheel.

(3) Position side ring (19) on the wheel so it will interlock at the valve stem. Drive the side ring onto wheel.

(4) Inflate the tire to 45 psi and install valve cap (20) on valve stem.

Caution: **When inflating the tire, lay wheel with lock ring down and away from personnel.**

(5) Position the wheel mounting holes over the six wheel studs (22).

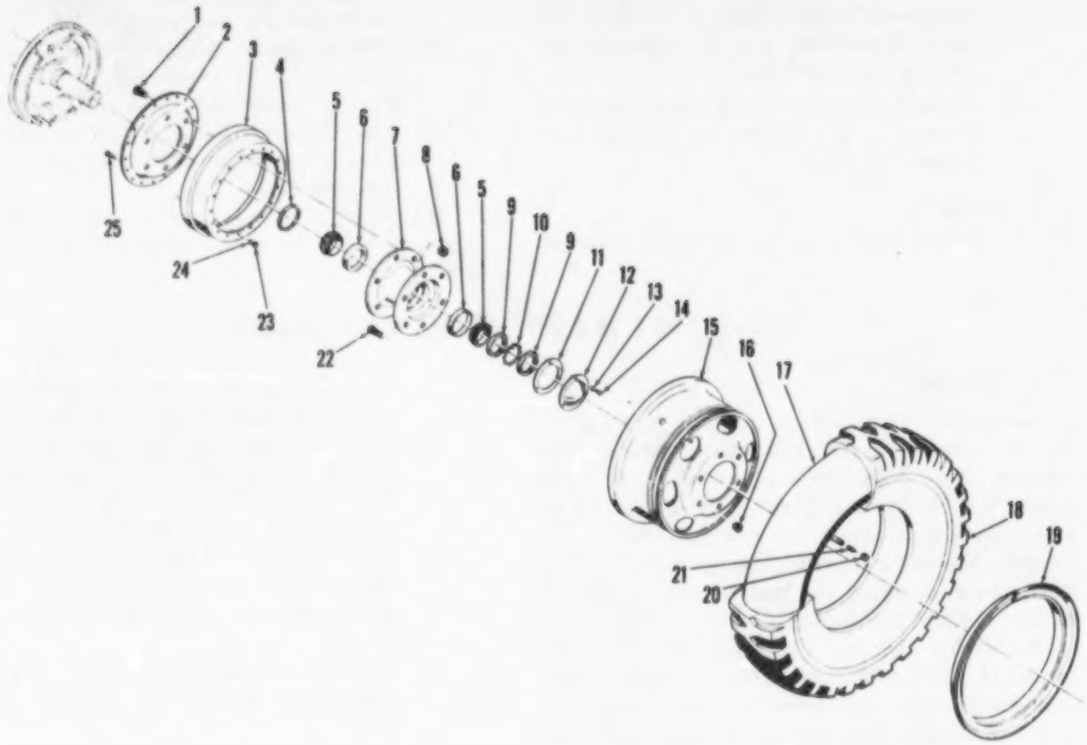
(6) Install six nuts (16) on the wheel studs and tighten them alternately to insure even tightening.

(7) Lower jack and remove from under axle. Check tightness of wheel nuts.

147. Wheel Hubs and Brake Drums

a. Removal.

(1) Remove the wheel from the hub as instructed in paragraph 146.



MEC 4930-206-15/28

1	Mounting bolt (6)	9	Adjusting nut (2)	18	Pneumatic tire
2	Back drum	10	Nut lock	19	Side ring
3	Brake drum	11	Gasket	20	Valve cap
4	Seal	12	Hub cap	21	Valve core
5	Bearing cone (2)	13	Lock washer (3)	22	Wheel stud (6)
6	Bearing cup (2)	14	Round head screw (3)	23	Lock nut (6)
7	Hub	15	Wheel	24	Flat washer (6)
8	Jam nut (6)	16	Wheel nut (6)	25	Serrated bolt (6)
		17	Inner tube		

Figure 28. Wheel, wheel bearings, tire and tube.

(2) Remove the three screws (14, fig. 28) and lockwashers (13) and remove hubcap (12) and gasket (11).

(3) Straighten the tabs of wheel bearing lock (10), which are bent to prevent the wheel bearing lock and adjusting nuts (9) from turning.

(4) Remove outer nut (9). Slide off wheel bearing lock (10) and remove inner nut (9).

(5) Pull the hub and drum of the axle stud spindle.

(6) Be extremely careful that the tapered roller bearing cone (5) does not fall out of the hub. Remove the tapered roller bearing cone (5) and cups (6).

b. Cleaning, Inspection and Replacement.

(1) Wash the two tapered roller bearing cones (5) in an approved cleaning solvent. Clean the bearings until all the old grease is removed.

(2) Inspect the bearing cones and cups for cracks, pits, scores, and burned spots.

(3) If any damage is found, replace the bearing cone and cup.

(4) Wash the axle spindle and inside the hub with an approved cleaning solvent. Dry thoroughly.

(5) Inspect the hub and brake drum for cracks, distortion, or wear, at the bearing cup seats in the hub. Replace a defective hub or brake drum.

(6) If the hub is not to be installed immediately, wrap the axle spindle with a clean cloth to protect it from dirt, moisture, and falling objects.

c. *Installation.*

(1) Position the inner bearing cone (5) on the axle stud spindle. Install the bearing cups (6) in the hub (7).

(2) Position the assembled hub and brake drum on the axle spindle.

(3) Install the outer tapered roller bearing cone on the hub.

(4) Make sure that the bearing cone is properly seated on the spindle.

(5) Screw the wheel bearing inner adjusting nut (9) onto the axle.

(6) Tighten the nut until the hub binds on the spindle.

(7) Back off the nut about one-eighth turn and check the adjustment by grasping the brake drum and attempting to rock it on the spindle.

Note. If bearing cones are properly adjusted, movement of brakedrum in relation to the top edge of the backing shield will scarcely be visible with the hub turning freely.

(8) Slide the lock (10) onto the spindle.

(9) Install the outer locknut (9) and draw it up tight against the lock.

(10) Bend two tabs of the lock over each nut.

(11) Position the gasket (11) and hub cap (12) over the end of the hub (7).

(12) Align the screw holes and secure the hubcap to the hub with the three round head screws (14) and lockwashers (13).

148. Service Brake Adjustment

a. *General.* Before adjusting the brakes, always check the wheel bearing adjustment. A satisfactory brake adjustment cannot be obtained unless wheel bearings are in proper adjustment. Do not adjust brakes when drums are hot.

b. *Adjustment.*

(1) Release all pressure from the braking system by opening the drain cock on the reservoir (fig. 19).

(2) Position chocks at the front and rear of the opposite wheel.

(3) Place a jack under the axle and raise one wheel of the trailer off the ground.

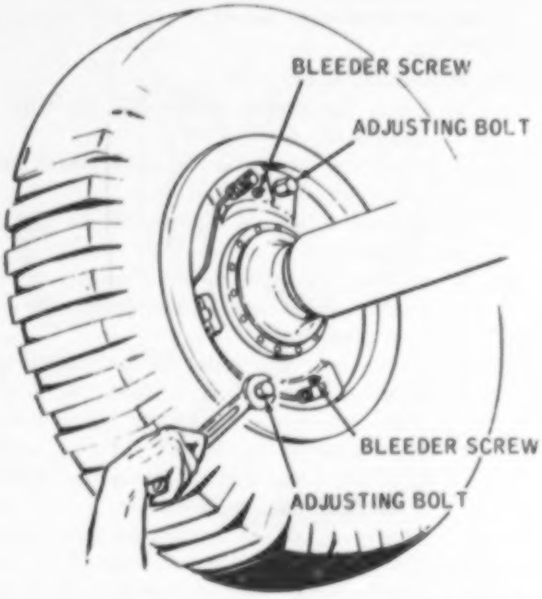


Figure 29. Service brake adjustment.

(4) Turn the brakeshoe adjusting stud as indicated in figure 29. Turn clockwise to expand the rear brakeshoe, until the brake drags slightly when the wheel or drum is turned by hand.

(5) Back off the adjusting stud enough to allow the drum to rotate freely.

(6) Turn the bottom adjusting stud counterclockwise to expand the front shoe in contact with the brakedrum.

(7) Proceed as in (5) and (6) above.

(8) Adjust the opposite wheel brakes in the same manner.

Note. After adjustment, test the brakes to make certain they are applying evenly.

149. Bleeding Brakes

a. *General.* It is necessary to bleed the hydraulic portion of the service brakes to expel any air which may have entered the system. Bleeding is required when a component of the service brake system has been replaced, or poor braking action is evident.

Bleeding can be done manually or with pressure filler.

Note. The trailer service brakes must be connected to the towing vehicle for manual bleeding operations as the brake pedal must be pressed and released to actuate the system. The master cylinder must be kept full during bleeding operations or air will enter and make rebleeding necessary.

b. Manual Bleeding.

(1) Clean the bleeder screws (fig. 29) with a clean cloth.

(2) Place a wrench over the bleed screw, and attach a tube to the screw.

(3) Place the other end of the tube into a jar or bottle.

(4) Remove the filler cap from the top of the master cylinder and fill the master cylinder with brake fluid.

(5) Pump the brake pedal on the towing vehicle until pressure is applied. Hold the pedal pressure. Open the bleed screw until pressure is released on the pedal. Close the bleed screw. Repeat the action until fluid has replaced the air in the system. Close and tighten the bleed screw.

(6) Remove the tube and wrench from the bleeder screw. Repeat the operation on the other wheel cylinders.

Note. Fill the master cylinder before bleeding the opposite wheel.

(7) Install the filler cap in the master cylinder.

c. Pressure Feed Filler Bleeding.

(1) Remove the filler cap from the master cylinder.

(2) Connect the hose of pressure feed filler with the proper size adapter to the opening for the master cylinder filler cap.

(3) The filler should contain from 10 to 20 psi air pressure and sufficient fluid to maintain constant fluid level in the master cylinder.

(4) Bleed the system as in manual bleeding (*b* above) except that manual operation of the brake pedal is not required.

150. Brakeshoes and Linkage

a. Removal.

(1) Open the air reservoir drain cock.

(2) Remove the hub and brakedrum (para 147).

(3) Remove the brakeshoe retracting springs (19, fig. 30).

(4) Remove the C washers (23) and washers (21 and 22). Remove lever (33) and link (20).

(5) Remove nut (17), lockwasher (16), washer (15) and sleeve (11) from bolt (5) securing the shoe to brake backing plate (8).

(6) Remove guide screw (34), lockwasher (16), guide bolt washer (15) and sleeve (11) that secures other shoe to backing plate (8).

(7) Lift the shoes off the backing plate and away from the wheel cylinder push rods.

(8) Remove pins (18) from brake shoes (35).

b. Installation.

(1) Install pins (18) using washers (13), and nuts (12), into the brakeshoes (35) prior to installing the shoes. Install lever (33) of the rear shoe and the link (20) on the top pin (18) of the front shoe using lockwasher (21) and plain washer (22) and securing them with C washer (23).

(2) Position the shoe with internal lever (33) on brake backing plate (8). Slide the top end of the shoe to a position opposite the clevis at the end of the wheel cylinder push rod. Rotate the anchor pin (25) in the large opening of the anchor support (28) and adjusting screw nut (27), to align the notch in the pin with the notch in the support.

(3) Slide the top end of the shoe into the push rod clevis and notches of the pin and support.

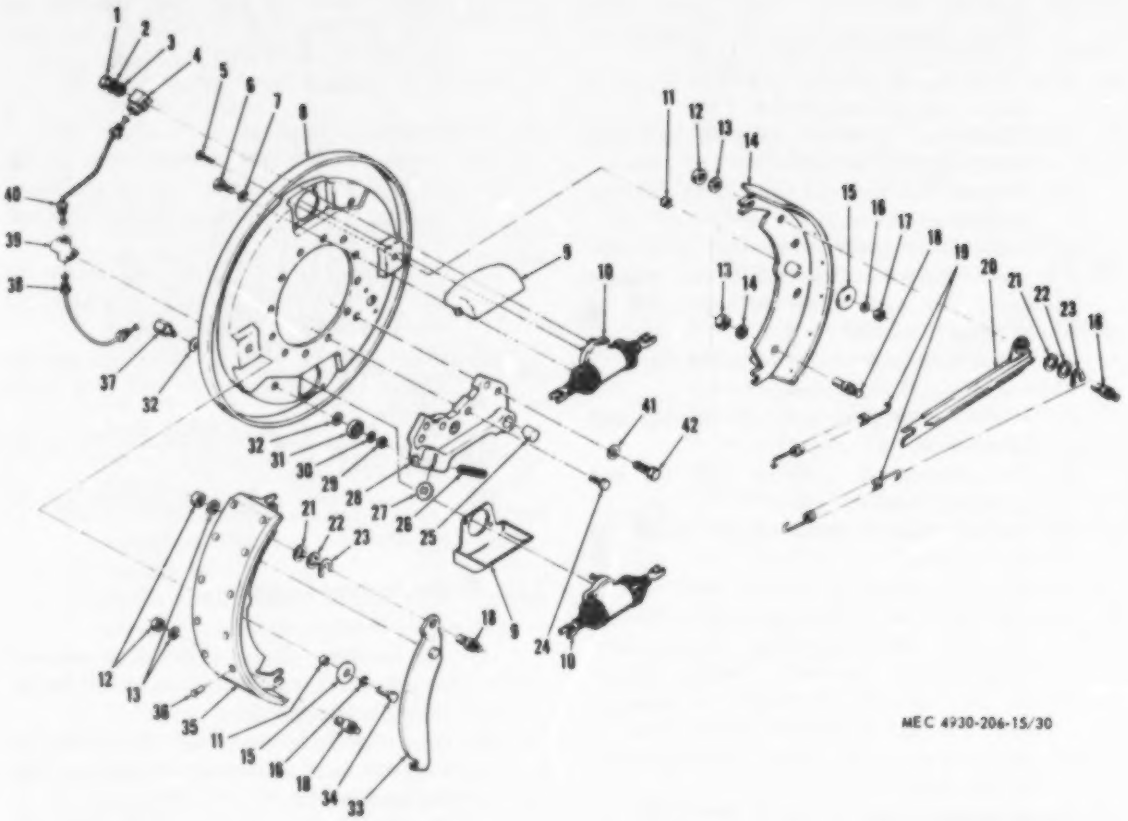
(4) Slide the lower end of the shoe into the notch in the cylinder portion of the installed lower anchor support and adjusting screw nut (27) to the seat on the face of the adjusting screw (26).

(5) Position the shoe with link (20) on the brake backing plate, making sure the forked end of the link extending from the shoe seats over the pin fitted to the rear of the internal lever.

(6) Slide the top end of the shoe into the push rod clevis and notches in the pin and support.

(7) Slide the lower end of the shoe into the notch in the cylinder portion of installed lower anchor support and adjusting screw nut (27), to seat on the face of the adjusting screw (26).

(8) Secure the brakeshoe and internal lever (33) to the backing plate (8) by placing the sleeve (11), shoe guide bolt washer (15), lockwasher (16) onto the guide screw (34), and inserting the screw through



1	Fitting bolt (2)
2	Gasket (2)
3	Gasket (2)
4	Fitting (2)
5	Guide bolt
6	Hex head bolt (4)
7	Lock washer (4)
8	Backing plate
9	Cover (2)
10	Wheel cylinder assy (2)
11	Bolt sleeve (2)
12	Hex nut (4)
13	Lock washer (4)
14	Brake lining (2)
15	Plain washer (2)
16	Lock washer (2)
17	Hex nut
18	Link pin (4)
19	Return spring (2)
20	Brake link
21	Spring washer (4)
22	Plain washer (4)
23	C-washer (4)
24	Hex head bolt (4)
25	Anchor pin (2)
26	Adjusting screw (2)
27	Adjusting nut (2)
28	Support (2)
29	Hex nut (4)
30	Lock washer (4)
31	Adjusting gear (2)
32	Stud washer (4)
33	Emergency lever
34	Cap screw
35	Brake shoe (2)
36	Rivet (28)
37	Gear stud (2)
38	Hydraulic tube
39	Fitting
40	Hydraulic tube
41	Lock washer (4)
42	Hex head screw (4)

Figure 30. Wheel brake assembly.

the mounting hole in the brake backing plate into the distributor fittings (39).

Note. Screw (34) will secure the distributor fitting (39) to the rear of the brake backing plate.

(9) Secure the other brakeshoe with link (20) to the backing plate (8) by placing the bolt (5) through the brake backing plate bolt hole and brakeshoe (35). Place the sleeve (11), washer (15), lockwasher (16) and nut (17) onto the bolt (5) and tighten nut.

(10) Install the upper shoe retracting springs (19) on the retracting spring pins (18) in the forward and rear shoes.

(11) Install the lower shoe retracting spring (19).

(12) Install the hub and brake drum (para 147).

(13) Adjust the brakes (para 148).

(14) Bleed the brake system (para 149).

151. Brake Wheel Cylinders, Hydraulic Lines and Fittings

a. Removal.

(1) Remove the wheel with the tire.

(2) Remove the brake shoes (para 150). Place clamps on the wheel cylinders to secure the pistons in the cylinders.

Note. Do not allow the brake fluid to come in contact with the brake linings.

(3) Disconnect the wheel cylinder hydraulic hose from the rear of the backing plate.

(4) Remove the lines (38 and 40, fig. 30) and the fittings (4 and 39).

(5) Remove the two cap screws (6) and lockwashers (7) securing each wheel cylinder cover (9) and wheel cylinder (10) to backing plate (8).

(6) Remove cylinders (10) and cover (9).

b. Disassembly of Wheel Cylinder.

(1) Remove two push rods (1, fig. 31) and boots (2).

(2) Pull pistons (3), cylinder cups (4) and spring (7) from body (6).

(3) Unscrew and remove bleeder screw (5) from body (6).

c. Cleaning, Inspection and Replacement.

(1) Clean all parts of the brake wheel cylinders, hydraulic lines and fittings, except rubber parts, with an approved cleaning solvent.

(2) Inspect all parts for wear and damage. Inspect tubes for obstructions or cracks.

(3) Replace all worn parts at reassembly. Replace boots.

d. Reassembly of Wheel Cylinder.

(1) Place spring (7, fig. 31) inside body (6). Install cylinder cups (4) and pistons (3) inside body.

(2) Install boots (2) and push rods (1) at ends of body (6). Place clamp over cylinder to secure rods until installation.

(3) Screw bleeder screw (5) into body (6).

e. Installation.

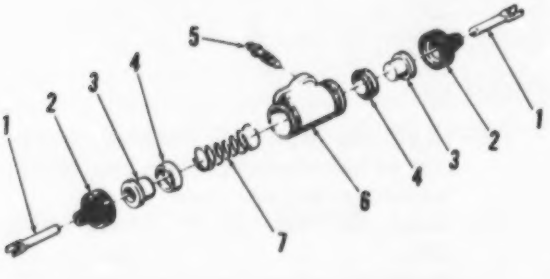
(1) Position each wheel cylinder cover (9, fig. 30) and wheel cylinder (10) on the brake backing plate (8) aligning holes for installation of attaching parts.

(2) Place lockwashers (7) on cap screw (6) and insert through backing plate and into wheel cylinder. Tighten screws.

(3) Insert bolts (1) through gaskets (2 and 3), fittings (4) and screw the bolt into wheel cylinder.

(4) Connect line assemblies (38 and 40) to the wheel cylinders.

(5) Connect wheel cylinder hydraulic hose to fitting (39).



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1	Push rod (2)	5	Bleeder screw
2	Boot (2)	6	Body
3	Piston (2)	7	Spring
4	Cylinder cup (2)		

Figure 31. Wheel cylinder assembly.

152. Brake Master Cylinder

a. Removal.

(1) The master cylinder (fig. 19) is mounted on the bracket of the inside of trailer chassis towing tongue.

(2) Open the drain cock (fig. 19) on the air reservoir tank to release all pressure from the system.

(3) Unscrew the inverted flare tube nut (38, fig. 32) from the connector (39).

(4) Remove the outlet fitting from the master cylinder.

(5) Remove the attaching nuts (24, fig. 33) and lockwashers (23) securing the cylinder to the bracket (13) and brake chamber body (3).

(6) Hold the air chamber, and move the master cylinder backward. Remove the cylinder.

b. Removal of Vent Tube and Filler Cap.

(1) Loosen the round head screw of hose clamp (33, fig. 32) and pull the vent tube breather hose (33) from the vent tube.

(2) Unscrew the vent tube (30, fig. 32) from the filler cap.

(3) Remove the filler cap (27, fig. 33) by turning it counterclockwise.

c. Cleaning, Inspection and Replacement.

(1) Clean all metal parts in an approved cleaning solvent.

(2) Wash all rubber parts in a mild soap-water solution.

(3) Inspect all metal parts for cracks, breaks, or other damage. Inspect the vent tube for plugged condition or damage.

(4) Inspect all threaded parts for stripped or crossed threads.

(5) Replace all damaged or excessively worn parts.

d. Installation.

(1) Position the filler cap (27, fig. 33) and filler cap gasket (26) in position on master cylinder. Screw into hole provided.

(2) Screw the vent tube (29, fig. 32) into the filler cap and tighten.

(3) Slide the vent tube hose clamp (33, fig. 32) on the vent tube hose. Slide the vent hose and clamp over the vent tube and secure by tightening round head screw on clamp.

(4) Position master cylinder over the three mounting studs and flush with the mounting bracket.

(5) Make certain that the brake air chamber piston is properly seated in the master cylinder.

(6) Secure the master cylinder in position with lockwashers (23, fig. 33) and nuts (24).

(7) Screw the connector (39, fig. 32) into the master cylinder. Screw the inverted flare nut (37) into the reducer outlet fitting and tighten.

(8) Fill the master cylinder with hydraulic brake fluid.

(9) Bleed the brakes (para 149).

153. Brake Air Chamber

a. Removal.

(1) Disconnect the air hose coupling (fig. 3) from the towing vehicle.

(2) Open the drain cock on the air pressure tank (fig. 19) to release all pressure from the brake air system.

(3) Disconnect the air line from the brake air chamber connection.

(4) Remove the three nuts (24, fig. 33) and lockwashers (23) securing the air chamber to the master cylinder and bracket (13).

(5) Hold the master cylinder and move the air chamber toward the front of the trailer to remove it from the bracket (13, fig. 33) and master cylinder.

b. Cleaning, Inspection and Replacement.

(1) Clean the brake air chamber by wiping with a cloth moistened in an approved cleaning solvent.

(2) Inspect the brake air chamber for cracks, breaks or other damage. Inspect for leaks (*d* below).

(3) Replace the brake air chamber if inspection shows damage or malfunctioning after testing.

c. Installation.

(1) Position the brake air chamber mounting studs through the bracket (13, fig. 33) and master cylinder.

(2) Make sure the brake air chamber is aligned with the brake air chamber air line connection.

(3) Secure the brake air chamber with the three nuts (24, fig. 33) and lockwashers (23).

(4) Connect the brake air chamber air line.

(5) Close the drain cock on the air reservoir tank (fig. 19).

d. Leakage Test.

(1) With the brakes fully applied, coat the brake chamber flanges with soap suds to check for leaks.

(2) If leakage is evident, tighten the nuts evenly and tightly to stop the leak.

Note. Do not draw the nuts too tight as brake chamber cover and body warpage may result.

(3) Check the nonpressure side of the chamber for leakage by applying soap suds to the hole in the body of the brake air chamber.

(4) If leakage is found, replace the brake air chamber.

154. Air Filters and Intervehicular Air Hoses

a. Draining Air Filter.

(1) Remove the end plug (7, fig. 34) from the housing nut (6).

(2) Allow all condensation to drain from the filter (2). Wipe housing nut clean.

(3) Install the end plug in the housing nut.

b. Removal and Installation of Air Filter Element.

(1) Remove the housing nut (6, fig. 34).

(2) With the housing nut removed, the fiber washer (5), spring (4), air filter washer (3) and filter (2) will slide from the housing (1).

(3) Clean all parts, including the housing, with cleaning solvent.

(4) If the filter is damaged or soaked with oil or gummy deposits, replace it with a new one.

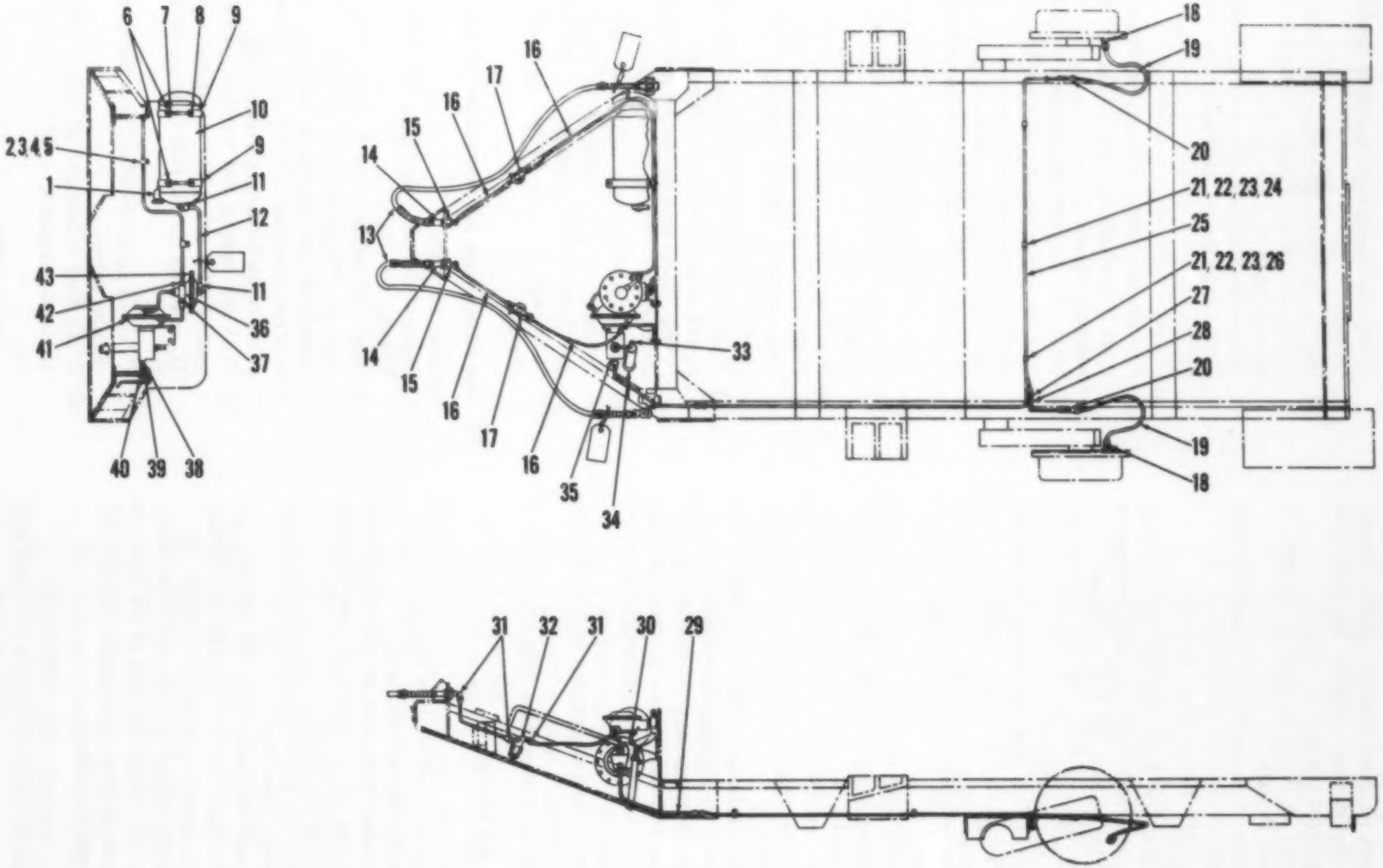
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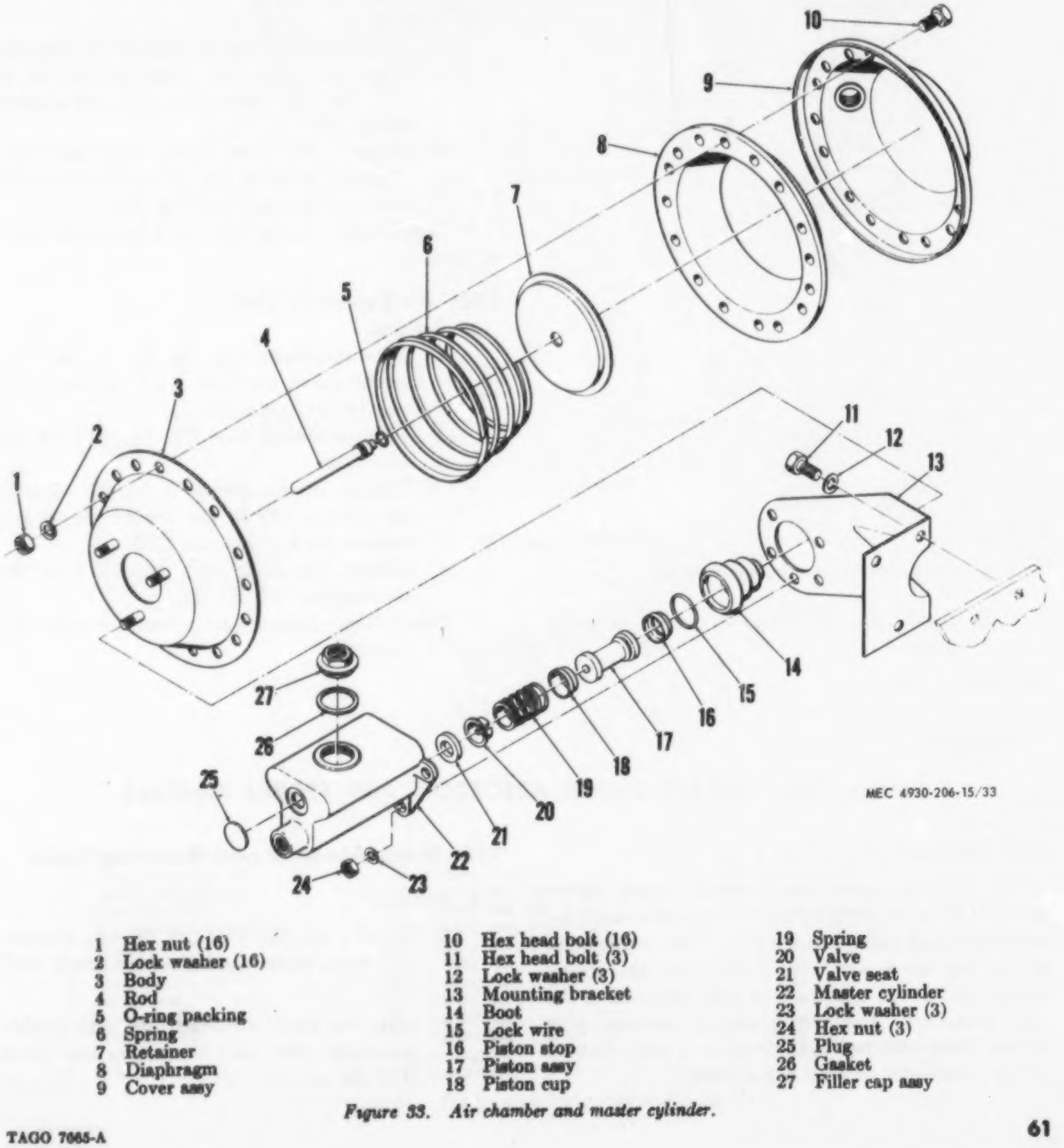
Figure 38. Trailer brake assembly.

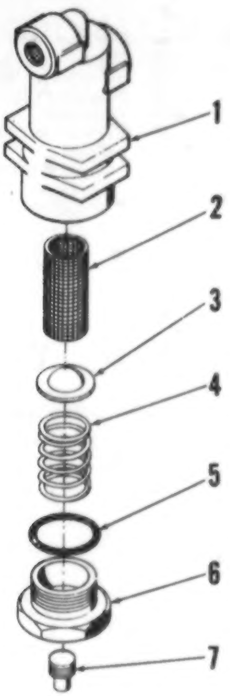
INDEX TO FIGURE 32

1 Drain cock
2 Lock washer (4)
3 Hex nut (4)
4 Screw (4)
5 Tube clip (4)
6 Hex nut (12)
7 Lock washer (12)
8 Screw (2)
9 Reservoir clamp (4)
10 Reservoir
11 Elbow (2)
12 Copper tube
13 Hose and coupling assy (2)
14 Pipe coupling (2)
15 Terminal bolt (2)
16 Copper tube
17 U-Bolt (2)
18 Elbow (2)
19 Hose assy (2)
20 Connector (2)
21 Stop nut (6)
22 Flat washer (6)
23 Hex head screw (6)
24 Clip (6)
25 Steel tube
26 Hex head bolt (10)
27 Union
28 Tee
29 Nylon tube
30 Vent tube assy
31 Tube connector (6)
32 Air cleaner assy (2)
33 Hose clamp
34 Breather hose
35 Master cylinder assy
36 Air cylinder stop
37 Pipe plug (2)
38 Tube nut
39 Cylinder connector
40 Gasket
41 Air cylinder assy
42 Tube elbow (4)
43 Emergency relay valve assy



1 Hex nut (16)
2 Lock washer (16)
3 Body
4 Rod
5 O-ring packing
6 Spring
7 Retainer
8 Diaphragm
9 Cover assy
10 Hex head bolt (16)
11 Hex head bolt (3)
12 Lock washer (3)
13 Mounting bracket
14 Boot
15 Lock wire
16 Piston stop
17 Piston assy
18 Piston cup
19 Spring
20 Valve
21 Valve seat
22 Master cylinder
23 Lock washer (3)
24 Hex nut (3)
25 Plug
26 Gasket
27 Filler cap assy

Figure 33. Air chamber and master cylinder.



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1 Housing
2 Filter
3 Washer
4 Spring
5 Gasket
6 Nut
7 End plug

Figure 34. Air cleaner assembly.

(5) Install the air filter in reverse order of disassembly.

c. Intervehicular Air Hoses.

(1) *Removal.*

Note. The two air hose assemblies (13, fig. 32) are removed and replaced in the same manner.

(*a*) Disconnect the air hose assembly (13, fig. 32) from the hose bracket on the trailer chassis.

(*b*) Unscrew the air hose assembly from coupling (14, fig. 32).

(2) *Installation.* Install the air hose assembly in reverse order of removal.

155. Air Relay Valve

a. Removal.

(1) Drain air from the air reservoir by opening drain cock (fig. 19). Remove the tubing (12, fig. 32) from the relay emergency valve (43).

(2) Remove the three bolts, nuts and lockwashers securing the valve to the panel. Remove the valve (43, fig. 32).

b. Installation. Install the valve in reverse order of removal.

156. Air Reservoir Tank

a. Removal.

(1) Open the drain cock (fig. 19) to drain any accumulated moisture from the air reservoir tank (10, fig. 32).

(2) Remove the air lines (12, fig. 32) from the reservoir.

(3) Remove the cap screws (8, fig. 32) securing the clamps (9) to the trailer frame and remove the air reservoir (10).

(4) Remove the drain cock (fig. 19) from the air reservoir (10, fig. 32).

b. Installation. Install the air reservoir in reverse order of removal.

Section XVII. TRAILER SHOCK ABSORBERS AND SPRING BUMPERS

157. General

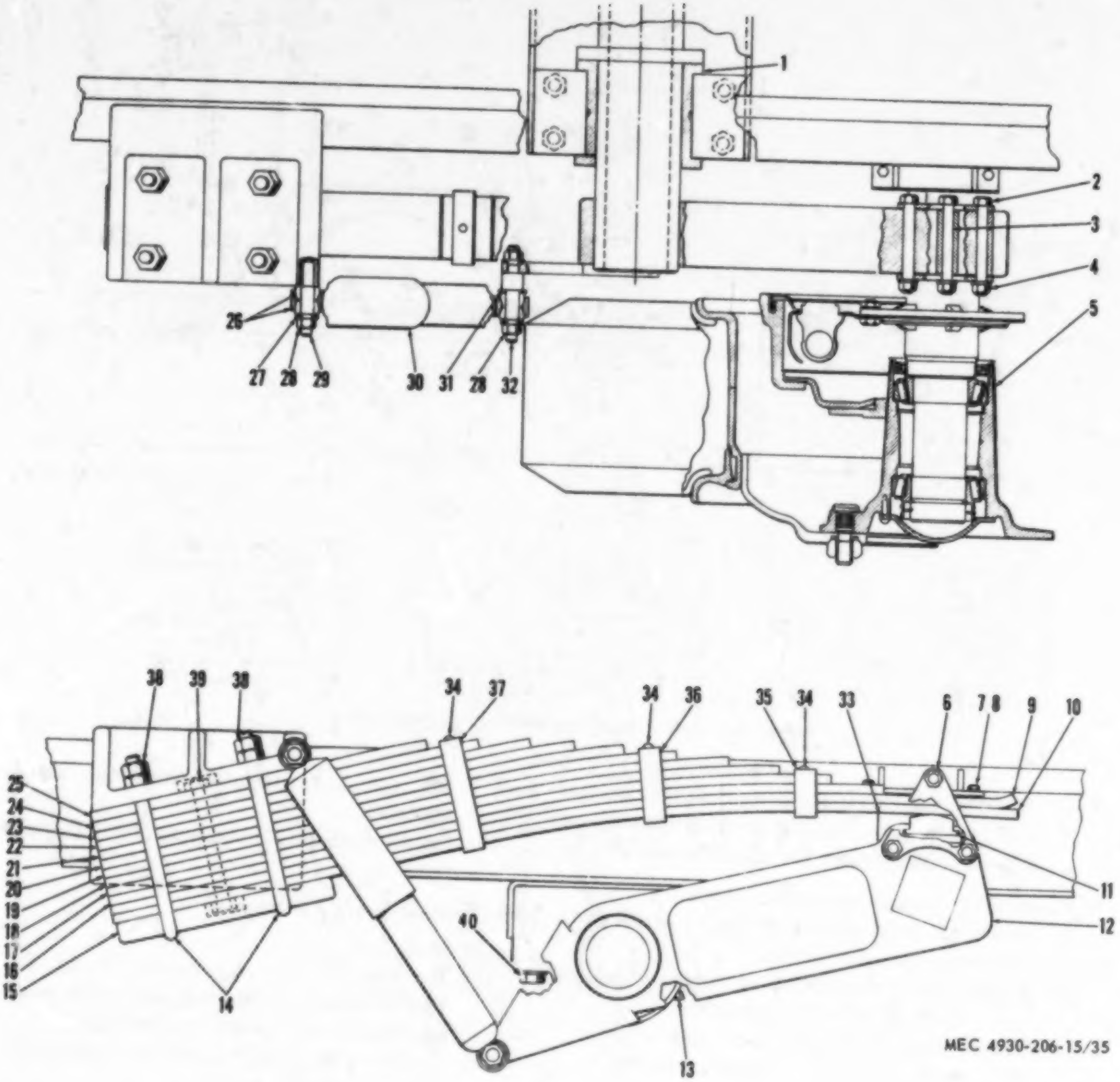
The shock absorbers are two-way control, direct acting, hydraulic cylinder units. The units are nonadjustable and cannot be refilled. They are secured at the top by a stud that screws into the spring hanger and at the bottom by a stud attached to the axle assembly. The spring bumper consists of a rubber block attached to the outside of each channel of the trailer chassis with cap screws.

158. Shock Absorber and Mounting Studs

a. Removal.

(1) Remove the two nuts (28, fig. 35), washers (27) from upper stud (29) and lower stud (32).

(2) Slide the shock absorber (30) with rubber grommets (26) from the upper and lower stud (29 and 32).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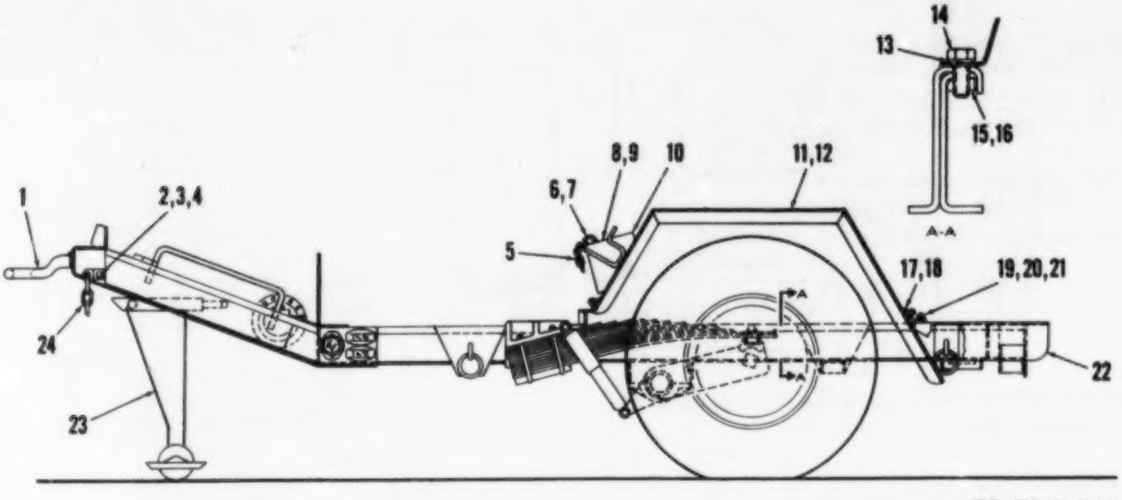
1 Split bearing (2)
2 Hex head screw (6)
3 Spring retainer (2)
4 Stop nut (12)
5 Hub and drum assy (2)
6 Guide plate (4)
7 Hex head screw (4)
8 Lock washer (4)
9 Spring leaf, No. 2 (2)
10 Spring leaf, No. 1 (2)
11 Wear pad (2)
12 Trailer axle
13 Grease fitting (2)
14 U bolt (4)
15 Spring clamp (2)
16 Spring leaf, No. 3 (2)
17 Spring leaf, No. 4 (2)
18 Spring leaf, No. 5 (2)
19 Spring leaf, No. 6 (2)
20 Spring leaf, No. 7 (2)
21 Spring leaf, No. 8 (2)
22 Spring leaf, No. 9 (2)
23 Spring leaf, No. 10 (2)
24 Spring leaf, No. 11 (2)
25 Spring leaf, No. 12 (2)
26 Grommet (8)
27 Flat washer (8)
28 Stop nut (6)
29 Upper mounting stud (2)
30 Shock absorber (2)
31 Flat washer (2)
32 Lower mounting stud (2)
33 Bumper (2)
34 Rivet (6)
35 Clamp (2)
36 Clamp (2)
37 Clamp (2)
38 Hex nut (16)
39 Nut and bolt assy (2)

Figure 35. Trailer assembly springs and shocks.



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1	Lunette
2	Stop nut (2)
3	Hex head screw (2)
4	Bevel washer (2)
5	Chain (2)
6	Bolt and nut assy (8)
7	Washer (8)
8	Outer block (12)
9	Center block (2)
10	Chock block assy (2)
11	Fender, RH
12	Fender, LH
13	Lockwasher (14)
14	Hex head screw (14)
15	Fender mounting bar, RH
16	Fender mounting bar, LH
17	Fender bracket, RH
18	Fender bracket, LH
19	Hex nut (8)
20	Lockwasher (32)
21	Hex head screw (32)
22	Trailer frame
23	Landing gear assy
24	Safety chain (2)

Figure 36. Trailer assembly splash guards and fenders.

(3) Remove the two inner grommets (26) and flat washer (31) from the lower studs (32). Unscrew and remove the studs (29 and 32).

b. Cleaning, Inspection and Replacement.

(1) Clean all parts except grommets with an approved cleaning solvent.

(2) Inspect the grommets for wear, rot or damage. Replace defective grommets.

(3) Inspect studs for bends, cracks and stripped or crossed threads. Replace defective studs.

(4) Test the shock absorber by pushing the lower section into the upper section. If little or no effort is required to compress the shock absorber it should be replaced.

c. Installation.

(1) Place inner washers (31, fig. 35) and grommets (26), with taper facing out, on upper and lower studs (29 and 32).

(2) Position the shock absorber (30) with the smaller end on lower stud (32) and larger end on upper (29).

(3) Place balance of grommets (26) on the upper and lower studs with the tapers on the grommets inserted into the shock absorber.

(4) Install washers (27) and nuts (28). Tighten nuts.

159. Trailer Spring Bumpers

a. Removal.

(1) Remove the two cap screws (7, fig. 35) and lockwashers (8) from the trailer chassis channel and spring bumper (33).

(2) Remove the spring bumper from the trailer chassis channel.

INDEX TO FIGURE 37

1	Swivel and spindle assy
2	Thrust washer
3	Plain washer
4	Hex nut
5	Grease fitting (2)
6	Gear cap
7	Bearing
8	Bevel gear
9	Handle pin (3)
10	Handle
11	Spring
12	Handle cup (2)
13	Spacer
14	Cap screw
15	Bevel gear
16	Flat washer (4)
17	Adjusting arm
18	Lockwasher
19	Adjusting handle
20	Head assy
21	Adjusting screw
22	Tube and pad assy
23	Wheel (2)
24	Wheel shaft
25	Cap screw
26	Leg
27	Hex nut
28	Lockwasher
29	Pivot bolt

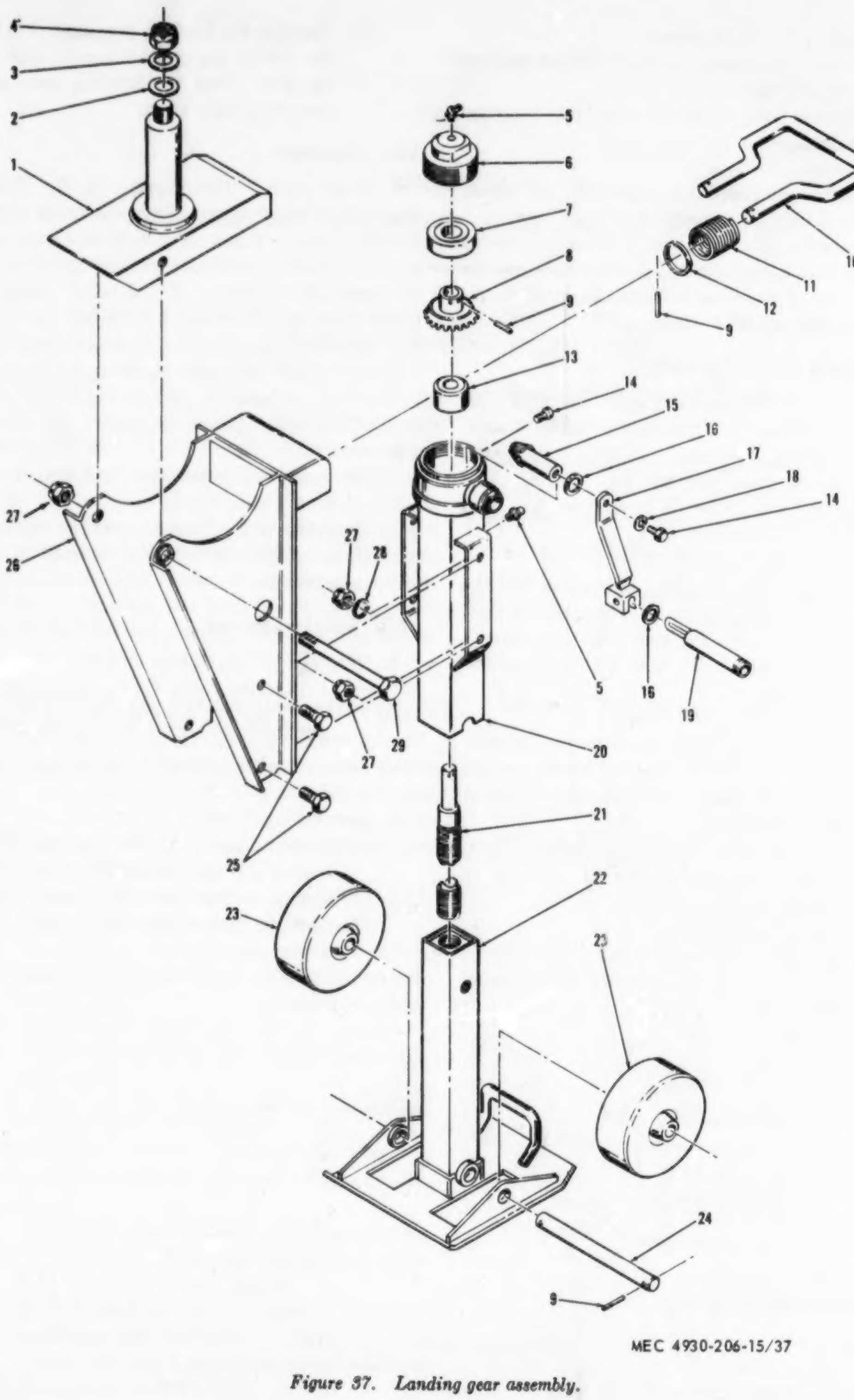
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Figure 37. Landing gear assembly.

b. Inspection and Replacement.

(1) Inspect the spring bumper (33) for rotting, fatigue or wear.

(2) Replace the bumper if worn, cut, fatigued or damaged.

c. Installation.

(1) Position the spring bumper (33, fig. 35) on the trailer chassis channel.

(2) Place the two lockwashers (8) on cap screws (7) and insert the cap screws through the trailer chassis channel into the spring bumper and tighten.

160. Landing Gear Assembly

a. Description. The landing gear assembly (23, fig. 36) is located on the front of the trailer frame. It is used to raise and support the trailer, so that it can be unhooked from the towing vehicle. The handle is turned clockwise to lower the jack and counterclockwise to raise the jack.

b. Removal and Disassembly.

(1) Remove nut (4, fig. 37) securing the landing gear assembly to the trailer frame. Remove the landing gear from the trailer.

(2) Refer to figure 37 and disassemble the landing gear.

c. Cleaning, Inspection and Repair.

(1) Clean all parts with an approved solvent.

(2) Inspect the bevel gears, screw, roller bearing and spacer for damage. Replace parts as necessary.

(3) Inspect all other parts for broken, bent, cracked, or warped condition. Repair or replace as necessary.

d. Assembly and Installation.

(1) Reassemble the landing gear assembly in reverse order of disassembly as indicated on figure 37.

(2) Position the landing gear assembly beneath the trailer frame and install with nut (4, fig. 37). Test the landing gear assembly for proper operation.

161. Lunette

a. Description. The lunette (1, fig. 36) is the large metal ring mounted on the front end of the trailer frame. When in use it is fitted over the pintle on the rear of the towing vehicle to couple the vehicles. Because of the offset design of the lunette, it can be raised or lowered by turning it 180 degrees if the coupling operation requires more height. Loosen the nuts coupling the lunette prior to turning the lunette. When the lunette is in the desired position, tighten the nuts.

b. Removal.

(1) Remove the jam nut, nut and flat washer from the lunette.

(2) Remove the lunette from the trailer chassis.

c. Installation. Install the lunette in reverse order of removal.

162. Safety Chains

a. General. Two safety chains (24, figure 36) are mounted on the front of the frame just behind the lunette. They are hooked into eye bolts at the rear of the towing vehicle to stop the trailer chassis from becoming unhooked should the pintle or lunette fail.

b. Removal.

(1) Remove the stop nut (2, fig. 36), bevel washer (4) and screw (3) from the trailer chassis to free the safety chain (24).

(2) Remove the safety chain (24) from the trailer chassis.

c. Installation. Install the safety chain in reverse order of removal.

CHAPTER 4
DEMOLITION, SHIPMENT, AND LIMITED STORAGE

Section I. DEMOLITION OF THE LUBRICATING AND SERVICING UNIT TO PREVENT ENEMY USE

163. General

When capture or abandonment of the lubricating and servicing unit to an enemy is imminent, the responsible unit commander must make the decision either to destroy the equipment or to render it inoperative. Based on this decision, orders are issued which cover the desired extent of destruction. Whatever method of destruction is employed, it is essential to destroy the same initial parts of all lubricating and servicing units and all corresponding repair parts.

164. Demolition to Render The Lubricating and Servicing Unit Inoperative

a. Demolition by Mechanical Means. Use sledge hammers, crowbars, picks, axes, or any other heavy tools which may be available, together with tools normally included with the lubricating and servicing unit, to destroy the following:

(1) The engine carburetor, magneto, spark plug, starter, generator, and manifold.
(2) Compressor intake and exhaust valves, flywheel, unloader valves, pressure switch, and valves.
(3) Engine and compressor cylinder heads.
(4) Knock holes in the air receiver and lubricant tanks.

Note. The above procedures are the minimum requirements for this method.

b. Demolition by Misuse. Perform the following to render the lubricating and servicing unit inoperative.

(1) Drain the engine crankcase and compressor air reservoir. Start the engine and allow it to run until failure occurs.
(2) Throw sand or other abrasive into the crankcase and fuel tank.

Note. The above procedures are the minimum requirements for this method.

165. Demolition by Explosives or Weapons Fire

a. Explosives. Place as many of the following charges (fig. 38) as the situation permits and detonate them simultaneously with detonating cord and a suitable detonator.

(1) One ½-pound charge between the carburetor and cylinder.

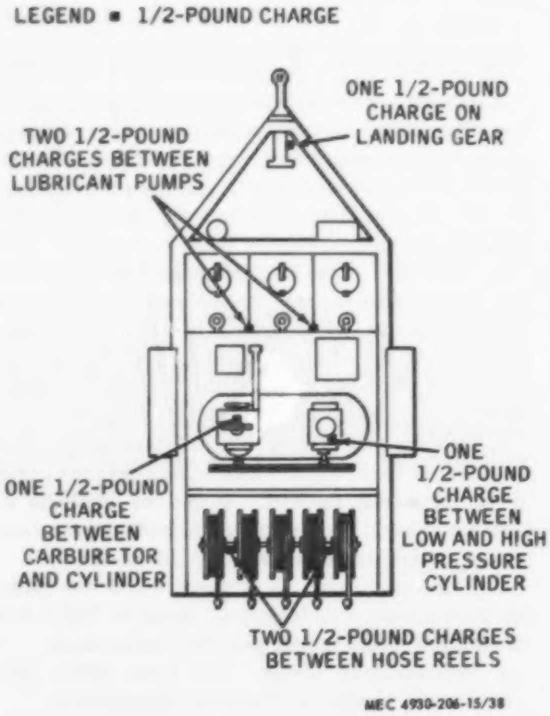
LEGEND ■ 1/2-POUND CHARGE
ONE 1/2-POUND CHARGE ON LANDING GEAR
TWO 1/2-POUND CHARGES BETWEEN LUBRICANT PUMPS
ONE 1/2-POUND CHARGE BETWEEN CARBURETOR AND CYLINDER
ONE 1/2-POUND CHARGE BETWEEN LOW AND HIGH PRESSURE CYLINDER
TWO 1/2-POUND CHARGES BETWEEN HOSE REELS
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Figure 38. Placement of demolition charges.

(2) One ½-pound charge between low and high pressure cylinder.

Note. The above procedures are the minimum requirements for this method. If plastic explosives are used, mold to get best possible contact. Packing mud tightly around explosives will greatly increase efficiency.

(3) Two ½-pound charges between hose reels.
(4) Two ½-pound charges between lubricant pumps.
(5) One ½-pound charge on landing gear.

b. Weapons Fire. Fire on the lubricating and servicing unit with the heaviest practical weapons available.

166. Other Demolition Methods

a. General. If the situation prohibits employing either of the preferred methods, use the following, either single or in combination.

b. Demolition by Scattering and Concealment. Remove all easily accessible vital parts such as the starter, generator, magneto, carburetor, spark plug, and fuel pump. Scatter these parts through dense foliage, bury them in dirt or sand, or throw them in a lake, stream, well, or other body of water.

c. Demolition by Burning. Pack rags, clothing, or canvas under and around the engine. Saturate this packing with gasoline, oil, or diesel fuel, and ignite.

d. Demolition by Submersion. Push the unit into a body of water to provide water damage and concealment. Salt water will do greater damage to vital parts than fresh water.

167. Training

All operators should receive thorough training in the destruction of the lubricating and servicing unit. Refer to FM 5-25. Simulated destruction, using all of the methods listed above, should be included in the operator training program. It must be emphasized in training, that demolition operations are usually necessitated by critical situations when time available for carrying out destruction is limited. For this reason, it is necessary that operators be thoroughly familiar with all methods of destruction of equipment, and be able to carry out demolition instructions without reference to this or any other manual.

Section II. SHIPMENT AND LIMITED STORAGE

168. Preparation of Equipment for Shipment

a. General. Detailed instructions for the preparation of the lubricating and servicing unit for domestic shipment are outlined within this paragraph. Preservation will be accomplished in sequence that will not require the operation of previously preserved components.

b. Inspection. The lubricating and servicing unit will be inspected for any unusual conditions such as damage, rusting, accumulation of water, and pilferage. Inspection of the individual components and assemblies will be outlined on the "Preventive Maintenance Service, Quarterly" in this manual.

c. Cleaning and Drying. All contamination shall be removed from the lubricating and servicing unit by an approved method. Approved methods of cleaning, drying, types of preservatives, and methods of application are described in TM 38-230.

d. Painting. Paint all surfaces where the paint has been removed or damaged. Refer to TM 9-213 for detailed cleaning and painting instructions.

e. Depreservation Guide. DA Form 2258 (Depreservation Guide of Engineer Equipment).

(1) A properly annotated depreservation guide will be completed concurrently with preservation for each item of mechanical equipment. Any peculiar requirements will be outlined in the blank spaces on the form. The completed depreservation guide will be placed with the equipment in a waterproof envelope marked "Depreservation Guide," and fastened in a conspicuous location on or near the operator's controls.

(2) Prior to placing equipment in operation or to the extent necessary for inspection, depreservation of the item shall be performed as outlined on the depreservation guide.

f. Disassembly. Disassembled Parts and Basic Issue Items.

(1) Disassembly shall be limited to the removal of parts and projecting components that tend to increase the overall profile of the lubricating and servicing unit and that which is subject to pilferage.

(2) Disassembled items shall be packed with the publications in the toolbox if possible. Otherwise, items will be packed in a suitable container and secured to the lubricat-

ing and servicing unit to prevent loss or pilferage.

Note. If packing is required to provide adequate protection against damage during shipment, refer to TM 38-230 for guidance in crate fabrication.

g. Cooling System, Boxed or Crated. Completely drain the cooling system including radiation and block, space heater, or other accessories through which the coolant has circulated. Flush with clean water. Leave draincocks open.

h. Lubrication System. Check level of lubricant. Operate the engine at fast idle until lubricant has been circulated throughout the system.

i. Sealing of Openings. Openings that will permit the direct entry of water into the interior of gasoline engine-driven equipment, starting motor, generator, electrical enclosures or other similar components, shall be sealed with pressure-sensitive tape conforming to Specification PPP-T-60, Type III, Class I.

j. Fuel Tank. Drain fuel tank after engine preservation and fog interior with preservative oil, Type P-10, Grade 2, conforming to specification MIL-L-21260.

k. Air Cleaner. Seal all openings that permit the direct entry of water. Use Type III, Class I, pressure-sensitive tape conforming to Specification PPP-T-60, Type III, Class I.

l. Exterior Surfaces. Coat exposed machined ferrous metal surfaces with Type P-6 preservative conforming to Specification MIL-C-11796, Class 3. If preservative is not available, GAA-Grease, Automotive and artillery, may be used.

m. Marking. Marking shall conform to MIL-STD-129.

n. Batteries and Cables. Batteries shall be filled, fully charged, and secured in the battery drawer. Cables shall be disconnected, vent holes sealed, and all terminals wrapped and secured with Type III, Class I, pressure-sensitive tape conforming to Specification PPP-T-60.

169. Loading Equipment for Shipment

If it is impossible to wheel the lubricating and servicing unit onto the carrier, use appropriate materials handling equipment of sufficient capacity to lift the lubricating and servicing unit onto the carrier. Block and tie the unit to the carrier to assure that it will not move during transit.

170. Preparation of Equipment for Storage

a. Detailed instructions for preparation of the lubricating and servicing unit for limited storage are provided in the following paragraph. Limited storage is defined as storage not to exceed six (6) months. Refer to AR 743-505.

b. Inspections and preservation procedures shall be as outlined in paragraph 168*b* through *l*, except the crankcase of the engine and mounted accessories will be filled to operating level with Type P-10, grade 2, preservative oil. The preservative is to remain in the crankcase during subsequent quarterly inspections.

c. Every effort should be made to provide covered storage for the lubricating and servicing unit. If this is impossible, select a firm, level, well-drained storage location, protected from prevailing winds. When the lubricating and servicing unit is to be placed in limited storage for over 90 days, block the unit to remove all weight from the tires and deflate tires to two-thirds normal pressure. When the unit is not blocked up, inflate tires to normal pressure. Position the lubricating and servicing unit on heavy planking. Cover the lubricating and servicing unit with a tarpaulin or other suitable waterproof covering and secure in a manner that will provide the lubricating and servicing unit maximum protection from the elements.

171. Inspection and Maintenance of Equipment in Storage

Every 90 days, the lubricating and servicing unit will be inspected as outlined on the "Preventive Maintenance Services, Quarterly" and operated long enough to insure complete lubrication of all bearings. Following each inspection period, the lubricating and servicing unit shall be represerved as outlined in preceding paragraph.

CHAPTER 5

DIRECT AND GENERAL SUPPORT AND DEPOT MAINTENANCE INSTRUCTIONS

Section I. GENERAL

172. Scope

a. These instructions are published for the use of direct and general support and depot maintenance maintaining the Gray Model 251–437 Lubricating and Servicing Unit. They provide information on the maintenance of the equipment, which is beyond the scope of the tools, equipment, personnel, or supplies normally available to the using organization.

b. The direct reporting by the individual user, of errors, omissions, and recommendations for improving this manual is authorized and encouraged. DA Form 2028 (Recommended Charges to DA Publications) will be used for reporting these improvements. This form will be completed in triplicate using pencil, pen, or typewriter. The original and one copy will be forwarded direct to: Commanding General; U.S. Army Mobility Equipment Center, ATTN: SMOME–MMP, Post Office Drawer 58, St. Louis, Mo. 63166.

c. Report all equipment improvement recommendations as prescribed by TM 38–750.

173. Record and Report Forms

a. DA Form 2258 (Depreservation Guide of Engineer Equipment).

b. For record and report forms applicable to direct and general support and depot maintenance refer to TM 38–750.

Note. Applicable forms, excluding standard Form 46, which is carried by the operator, shall be kept in a canvas bag mounted on the equipment.

Section II. DESCRIPTION AND DATA

174. Description

For a complete description of the Gray Model 251–437 Lubricating and Servicing Unit, see paragraph 3.

175. Tabulated Data

a. General. This paragraph contains all the overhaul data pertinent to direct and general support and depot maintenance personnel. A wiring diagram, figure 4, is also included.

b. Tabulated Data. Refer to paragraph 4*b* for the complete tabulated data of the lubricating unit.

c. Nut and Bolt Torque Data.

Cylinder-head nuts	35–40 ft. lbs.
Manifold nuts	35–40 ft. lbs.
Connecting rod bolts and nuts	35–40 ft. lbs.

d. Repair and Replacement Standards. Table I lists manufacturer's sizes, tolerances, desired clearances, and maximum allowable wear and clearances for the compressor assembly. Refer to appendix I for the applicable technical manuals concerning the engine assembly and the specific repair and replacement standards related to the engine assembly.

e. Wiring Diagram. Refer to figure 4 for the wiring diagram of the lubricating and servicing unit.

Table I. Compressor Repair and Replacement Standards

Component	Manufacturer's dimensions and tolerance in inches		Desired clearance		Maximum allowable wear and clearance
	Min	Max	Min	Max	
Cylinders:					
Bore, low-pressure	4.625	4.626	0.002	0.003	0.006
Bore, high-pressure	2.500	2.5005			0.006
Taper	0.001	0.001			
Out-of-round	0.001	0.001			0.002
Crankshaft:					
Journal size, main bearing	1.376	1.377			
Journal size, connecting rod	1.375	1.376			
Journal out-of-round		0.0005			
Journal taper		0.0002			
Pistons, piston pins, and piston rings:					
Piston size, low-pressure	4.6195	4.6200			0.0015
Piston size, high-pressure	2.4970	2.4975			0.0015
Piston pin diameter, low-pressure	0.92750	0.93775			0.001
Piston pin diameter, high-pressure	0.92750	0.93775			0.001
Piston pin length, high-pressure	2.118	2.123			
Piston pin length, low-pressure	4.250	4.250			
Piston pin clearance in piston			0.0002	0.0009	
Piston to cylinder clearance, low-pressure			0.00050	0.0055	
Piston to cylinder clearance, high-pressure			0.0025	0.0030	
Piston ring side clearance, low-pressure			0.0010	0.0025	
Piston ring side clearance, high-pressure			0.0010	0.0045	
Piston ring gap, low-pressure	0.013	0.023			
Piston ring gap, high-pressure	0.007	0.017			
Connecting rods and bearings:					
Bearing running clearance			0.0003	0.0016	
Bearing side clearance			0.0040	0.0012	
Bearing internal diameter	1.355	1.357			

CHAPTER 6
GENERAL MAINTENANCE INSTRUCTIONS

Section I. SPECIAL TOOLS AND EQUIPMENT

176. Special Tools and Equipment

No special tools and equipment are required to perform direct and general support and depot maintenance of the Gray Model 251–437 Lubricating and Servicing Unit.

177. Direct and General Support and Depot Maintenance Repair Parts

Direct and General Support and Depot Maintenance Repair Parts are listed in TM 5–4930–206–25P.

178. Specially Designed Tools and Equipment

No specially designed tools and equipment are required for the field and depot maintenance of the lubricating and servicing unit.

Section II. TROUBLESHOOTING

179. General

Paragraphs 179 through 186 provides information useful in diagnosing and correcting unsatisfactory operation or failure to the lubricating and servicing unit or any of its components. Each trouble symptom stated is followed by a list of probable causes of trouble. The possible remedy recommended is described opposite the probable cause. Refer to appendix I and the applicable technical manual concerning troubleshooting of the engine assembly.

180. Compressor High or Low Pressure System Overheats

Probable cause	*Possible remedy*
Scored piston or cylinder wall.	Replace piston or hone cylinder wall.
Broken discharge valves or springs.	Replace valves.

181. Compressor Knocks or Develops Excessive Noise

Probable cause	*Possible remedy*
Piston pins worn	Replace piston pins and/or pistons.
Connecting rods loose	Replace defective bearings. Tighten or replace defective connecting rods.

182. Compressor Air Contains Oil

Probable cause	*Possible remedy*
Pistons or rings worn	Replace pistons and/or rings.
Compressor cylinders out-of-round.	Replace cylinders.

183. Transfer Pump Does Not Operate

Probable cause	*Possible remedy*
Defective air valve and piston.	Repair or replace air valve or piston.
Defective foot valve	Repair or replace foot valve.
Defective riser tube	Replace riser tube.

184. Lubricant Supply Pump Does Not Operate

Probable cause	*Possible remedy*
Defective control valve	Replace control valve.
Defective lubricant supply pumps.	Repair high or low pressure supply pumps.

185. Lubricant Supply Pump Does Not Deliver Lubricant

Probably cause	*Possible remedy*
Binding trip rod	Disassemble air cylinder of the pump. Adjust gaskets and leather cups until trip rod is relieved.
Worn leather and glands	Replace glands and leather.

186. Trailer Brakes Fail

Probable cause	*Possible remedy*
Defective master cylinder	Repair or replace master cylinder.
Defective wheel cylinder	Repair or replace wheel cylinder.
Defective brakes and lining	Repair or replace defective brakes and lining.

Section III. RADIO INTERFERENCE SUPPRESSION

187. General

Refer to TM11-483 for definitions, purposes, source and methods used to obtain proper radio suppression.

188. Interference Suppression Components

Refer to paragraph 106 for a description of the interference suppression components. Refer to paragraph 107 for replacement of suppression components and paragraph 108 for testing of the components.

Section IV. REMOVAL AND INSTALLATION OF MAJOR COMPONENTS OR AUXILIARIES

189. General

This section contains the removal and installation instructions for the engine assembly, compressor assembly, the three lubrication pumps, reel bank assembly, alcohol injector assembly, control panel assembly, generator assembly, starter assembly and the clutch assembly.

190. Engine Assembly

a. Removal.

(1) Loosen screws (73, fig. 22) and nuts (48) attaching the engine assembly (17) to the mounting platform on the compressor assembly (50).

(2) Remove drive belts (68). Disconnect the throttle control and choke control leading from the control panel assembly (23). Disconnect the starter assembly electrically.

(3) Disconnect the exhaust deflector housing (71) from the engine assembly. Unscrew and remove screws (32) attaching exhaust guard (31) to the engine assembly. Remove the exhaust guard.

(4) Remove screws (25), nuts (20) and washers (22 and 24) attaching the control panel (23) to the engine assembly.

(5) Remove four screws (35) attaching exhaust tube (34) to engine assembly. Remove exhaust tube.

(6) Unscrew and remove drain cock (53) and adapter (72) from the engine assembly.

(7) Remove screws (73), lockwashers (49) and nuts (48) attaching the engine assembly. Remove the engine assembly.

b. Installation.

(1) Lower the engine assembly (17) over the mounting bracket being certain to align mounting screw holes.

(2) Install screws (73), lockwashers (49) and nuts (48). Finger tighten hardware. Final tightening is accomplished after installation and adjustment of drive belts (68).

(3) Install components to the engine assembly in the reverse order of disassembly as indicated in figure 22.

191. Compressor Assembly

a. Removal.

(1) Remove the compressor drive belt guard as indicated in paragraph 137.

(2) Remove the compressor drive belts from between the engine assembly and compressor assembly as instructed in paragraph 138 and figure 25.

(3) Remove the engine assembly from the compressor assembly as instructed in paragraph 190 and illustrated in figure 22.

(4) Unscrew and remove the four hex head cap screws and washers attaching the compressor assembly to the base of the lubricator assembly.

(5) Disconnect all tubing from the air storage tank to the reel bank assembly.

(6) Carefully remove the entire compressor assembly from inside the framework of the lubricator assembly.

b. Installation.

(1) Lower the complete compressor assembly (50, fig. 22) inside the lubricator assembly. Carefully align mounting holes. Install mounting hardware and tighten.

(2) Connect all air tubing to the compressor assembly.

(3) Install the engine assembly (17, fig. 22) as instructed in paragraph 190.

(4) Install the compressor assembly drive belts between the engine assembly and compressor assembly as instructed in paragraph 138.

(5) Install the compressor drive belt guard as instructed in paragraph 137.

192. Lubrication Pumps

a. Removal.

(1) All three of the lubrication pumps (4 and 5, fig. 7) are removed in the same manner.

(2) Each pump is attached to the lubricator tanks with four hex head cap screws and two clamps.

(3) Disconnect the air input hose from each lubricant pump. Disconnect the lubricant output hose to the reel bank assembly from each pump.

(4) Unscrew and remove the four hex head cap screws attaching each pump. Remove the two pump clamps at each pump. Using the lifting rings at the top. Hoist the pumps from the lubricator.

b. Installation.

(1) Hoist the individual pump in position over the lubrication storage tank.

(2) Align the mounting holes of pump and tank. Position the two pump clamps, again aligning mounting holes. Secure pump to tank with four cap screws.

(3) Connect the lubricant and air hoses to each pump after installation.

193. Reel Bank Assembly

a. Removal.

(1) Disconnect all reel hoses from overhead hoses leading to lubricant pumps. The hoses are shown on figures 8 and 9.

(2) Remove the eight hex nuts and lockwashers, and four cap screws. Lift the reel bank assembly from the four studs on the frame assembly.

b. Installation.

(1) Lower the reel bank assembly over the frame assembly aligning the four mounting holes with studs on the frame assembly.

(2) Secure reel bank assembly to the frame with eight lockwashers, four cap screws and eight hex nuts. Tighten attaching parts.

(3) Attach all reel hoses to the proper overhead hoses.

194. Alcohol Injector Assembly

a. Removal.

(1) The alcohol injector assembly (9, fig. 7) is mounted on a bracket that is attached to the frame assembly.

(2) Disconnect the two air hoses attaching the alcohol injector to the air system.

(3) Unscrew and remove the two hex head cap screws attaching the bracket to the frame assembly.

b. Installation.

(1) Align mounting holes of alcohol injector bracket with those of lubricator frame. Secure bracket to frame with two hex head screws.

(2) Attach air inlet and outlet hoses to alcohol injector.

195. Control Panel Assembly

a. Removal.

(1) Disconnect all components of the control panel assembly (23, fig. 22) electrically. Tag all leads to be certain of reassembly.

(2) Disconnect both the choke cable and throttle cable at the engine carburetor.

(3) Disconnect tubing from the Ignition-Magneto switch to the engine assembly.

(4) Unscrew and remove three screws (25) and washers (24). Remove nut (20) and washers (22). Lift control panel (23) from engine assembly.

b. Installation.

(1) Position the control panel assembly (23, fig. 22) on the engine assembly. Carefully align all mounting holes.

(2) Secure control panel assembly with nut (20), washers (22), washers (24), and screws (25). Tighten attaching parts.

(3) Connect the Ignition-Magneto tubing at engine assembly.

(4) Connect the choke and throttle cables at the carburetor.

(5) Connect all electrical leads to indicating instruments and switches at rear of control panel. Refer to figure 4, the wiring diagram, as an aid in connection of electrical components.

196. Generator Assembly

a. Removal.

(1) Release belt guard (5, fig. 22) by unscrewing and removing screws (4). Remove belt guard.

(2) Loosen attaching parts and press generator (9) towards engine assembly, to loosen drive belt (60). Remove drive belt.

(3) Disconnect the generator electrically from the cable assemblies.

(4) Unscrew and remove screws (61), washers (8) and nuts (7) attaching the generator assembly. Remove the generator assembly.

b. Installation.

(1) Position the generator assembly (9, fig. 22) in its brackets on the engine assembly.

(2) Install screws (61), washers (8) and nuts (7).

(3) Install belt (60) between pulley of generator assembly and engine assembly. Move generator away from engine to tighten belt. Belt must be tightened to a ½ to ¾-inch deflection at the midway point. Tighten attaching parts. Check belt deflection again.

(4) Connect generator electrically.

197. Starter Assembly

a. Removal.

(1) Disconnect the electrical cables from the starter assembly (36, fig. 22).

(2) Unscrew and remove cap screws (37) attaching starter assembly to engine assembly (17). Carefully remove starter from engine.

b. Installation.

(1) Position starter assembly (36, fig. 22) on engine assembly (17) being careful not to damage flywheel teeth or teeth of starter pinion.

(2) Install capscrews (37) securing starter assembly to engine assembly.

(3) Connect the starter assembly electrically.

198. Enclosure Assembly

a. Removal.

(1) Unscrew and remove the four lifting rings (fig. 3) at the top of the enclosure assembly (fig. 24).

(2) Using the four hand lifting devices (one at each side corner) carefully lift the enclosure assembly up and over the lubricator and off the frame.

b. Installation.

(1) Carefully lift the enclosure assembly up and over the lubricator being certain to align the enclosure assembly with the frame.

(2) Lower the enclosure in position aligning lifting ring holes.

(3) Install four lifting rings in position and tighten.

199. Clutch Assembly

a. Removal.

(1) Unscrew and remove the cap screw, lockwasher and adapter attaching the clutch assembly (26, fig. 22) to the engine assembly.

(2) Remove the pivot pin and cotter pin attaching the clutch handle to the flywheel cover (21).

(3) Pull the clutch away from the engine assembly.

b. Installation.

(1) Position the clutch assembly (26, fig. 22) over the clutch shaft.

(2) Install clutch retainer over the clutch shaft and against the clutch. Secure the parts with the cap screw and lockwasher provided.

(3) Attach the clutch handle at its pivot point on the flywheel cover with the pin and cotter pin.

200. Trouble Light

a. Removal. Unscrew and remove the two cap screws and lockwashers attaching the trouble light (fig. 18) to the overhead of the frame assembly. Disconnect the light electrically and remove.

b. Installation. Position the trouble light bracket against the frame assembly. Align the mounting holes and secure with capscrews and lockwashers. Connect the trouble light electrically.

CHAPTER 7
ENGINE REPAIR INSTRUCTIONS

Section I. ENGINE ASSEMBLY

201. General

The military standard engine is a 4-cylinder, air cooled, overhead-valve, gasoline engine capable of satisfactory operation in temperate, desert, arctic, and tropical environment, when serviced regularly. The engine is fully radio interference suppressed and fungus proofed. The Model 4A032-1 engine developes a rated horsepower at 3,600 revolutions per minute. Refer to appendix I for the applicable technical manuals for complete repair and overhaul instructions of the engine assembly.

Section II. GENERATOR ASSEMBLY

202. General

The generator assembly has an armature mounted at both ends on bearings. The armature rotates between pole shoes over which are wound field coils. The voltage and current developed in the armature windings is supplied through brushes riding on a commutator to the generator terminals and then to the batteries and other electrical accessories in the circuit.

a. Removal and Disassembly.

(1) *Removal.* Remove the generator as outlines in paragraph 196*a*.

(2) *Disassembly.*

(*a*) Unscrew and remove screws (11, fig. 39) and washers (12 and 13) attaching voltage control (14) to the body. Remove the voltage control.

(*b*) Remove screw (7) and lockwashers (8) attaching condenser (10). Remove condenser at lead cap (9). Unscrew and remove nut (5) and washer (4) from condenser.

(*c*) Unscrew and remove two bolts (1) and lockwashers (45). Unscrew and remove nuts (44) and lockwashers (43). Remove end frame (2).

(*d*) Remove dowel pin (42) from end frame (2). Remove bearing clamp (41) and bearing (40). Unscrew and remove screw (39) and washer (38) holding lead of rectifier (37). Remove rectifier. Remove insulator (3).

(*e*) Remove screws (36) and lockwashers (35) attaching brush assembly (34). Remove brush assemblies. Remove brush springs (33) and brush holders (32).

(*f*) Unscrew and remove nut (25) and lockwasher (24) attaching pulley (23). Remove pulley. Remove drive end frame (21), retaining plate (20) and spring (27). Remove collar (17).

(*g*) Remove key (16) from shaft of armature assembly (15). Remove armature. Remove pin (28) and grommet (6). Do not remove coil assembly (29) or pole shoes (30) unless replacement parts are necessary.

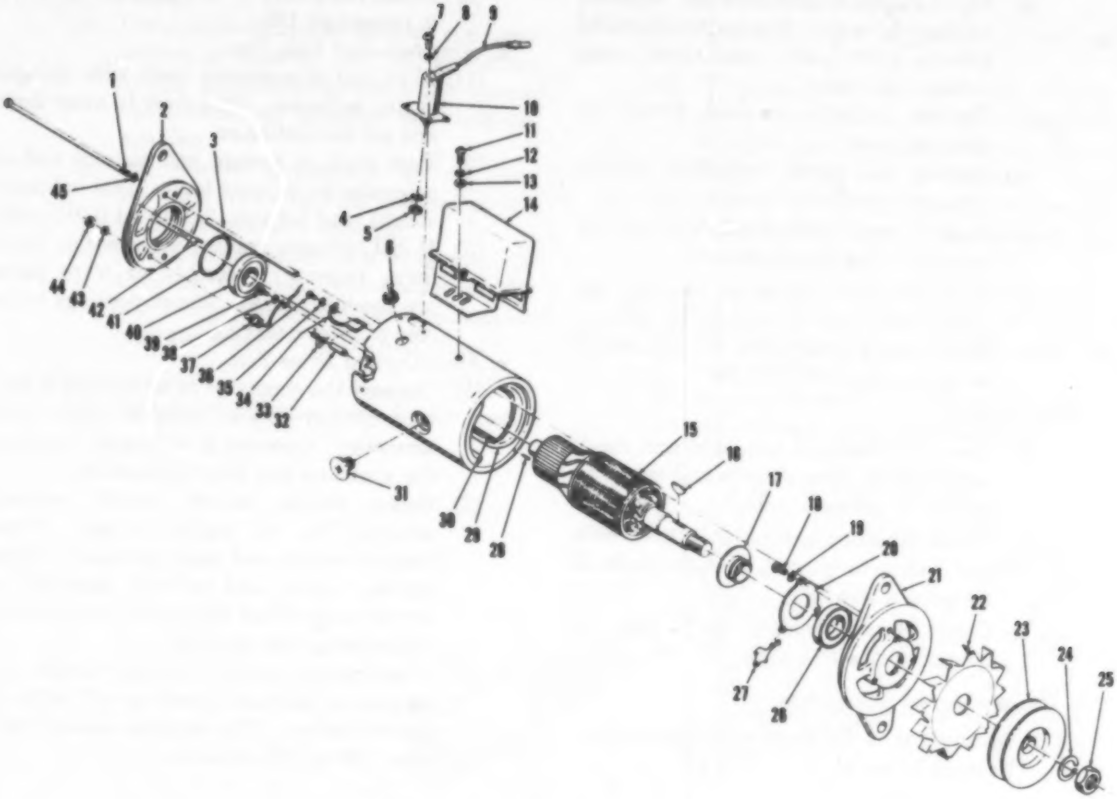
b. Cleaning, Inspection, Repair, and Testing.

(1) *Cleaning.*

(*a*) Use a cloth dampened with an approved solvent to wipe all dust, oil and other foreign material from the brush plates, end frames and armature and field assemblies.

(*b*) Use filtered compressed air to blow dust and dirt from the crevices of the armature and field windings.

(*c*) Secure the armature in a lathe. With the armature spinning, hold a sheet of No. 000 sandpaper against the commutator until the copper is bright and smooth.



MEC 4930-206-15/39

1 Bolt (2)
2 Commutator end frame
3 Field coil insulator (2)
4 Lockwasher
5 Hex nut (2)
6 Grommet
7 Round head screw (4)
8 Lockwasher (4)
9 Lead cap
10 Condenser
11 Round head screw (2)
12 Lockwasher (2)
13 Plain washer (2)
14 Voltage control
15 Armature assy
16 Woodruff key
17 Collar
18 Round head screw (3)
19 Lockwasher (3)
20 Retaining plate
21 Drive end frame
22 Fan
23 Pulley
24 Lockwasher
25 Hex nut
26 Ball bearing
27 Brush assembly spring (2)
28 Dowel pin
29 Coil assembly
30 Pole shoe (2)
31 Pole shoe screw (2)
32 Brush holder (2)
33 Brush spring (2)
34 Generator brush (2)
35 Lockwasher
36 Round head screw
37 Rectifier assy
38 Lockwasher
39 Round head screw
40 Ball bearing
41 Bearing clamp
42 Dowel pin
43 Lockwasher
44 Ground nut
45 Lockwasher (2)

Figure 39. Generator assembly.

(2) *Inspection.*

(*a*) Examine field coils for worn, burned and frayed insulation. Be certain connections between field coils are secure. Repair connections if necessary.

(*b*) Examine field frame assembly for cracks or distortions. Check thread conditions in tapped holes.

(*c*) Check drive end head for cracks or warping. Inspect shaft end of armature for damage and wear.

(*d*) Examine pulley for broken flanges and worn shaft hole. Inspect brushes for wear or damage.

(3) *Repair.*

(*a*) Check commutator with a dial indicator for out-of-round. If total out-of-round exceeds 0.001 inch, turn down commutator on lathe.

(*b*) Replace armature or coils if test indicate shorts.

(*c*) Replace all parts indicating cracks, wear, or damage.

(*d*) Replace brush springs that are worn or fatigued. Replace brushes.

(*e*) Undercut mica insulation between the commutator bars to a depth of $\frac{1}{32}$-inch. When undercutting mica, the cut should be square and free of burrs.

(4) *Testing.*

(*a*) Use a conventional test light and check field coils for open circuits and shorts to ground or between coils.

(*b*) Check armature assembly for open coils and shorts to ground, or between coils by using a test light.

(*c*) Check brush holders for shorts to ground with a test light.

c. Reassembly and Installation.

(1) Reassembly is the reverse of disassembly. Refer to figure 39.

(2) Install the generator assembly as instructed in paragraph 196.

d. Armature End Play Test.

(1) Align end of armature shaft with plunger of dial indicator. Pull shaft to outer limit and set dial indicator.

(2) Push shaft in toward commutator end of generator to its inner limit. Dial indicator should read between 0.003 and 0.010 inch.

(3) If dial indicator reading is not within these linits, improper assembly or worn parts are possible causes. Check bearings to be sure of proper seating.

e. Field Current Draw Test.

(1) Connect the generator in series with a battery, battery switch, variable resistor and ammeter. Connect a voltmeter between the armature and field connections.

(2) Before closing battery switch, connect ammeter to its highest range. Close battery switch and read ammeter. Open battery switch and connect ammeter to lowest range which will safely carry current indicated in first reading.

(3) Close battery switch. Adjust variable resistance to produce a reading of 5 volts on the voltmeter. The ammeter should indicate 1.00 to 1.05 amperes.

Section III. STARTER ASSEMBLY

203. General

The enclosed shift lever cranking motor has the shift lever mechanism and the solenoid plunger enclosed in the drive housing protecting them from exposure to dirt, icing conditions, and splash. A solenoid switch mounted to the flange on the starting motor drive housing operates the over running clutch drive by means of a linkage and shift lever. When the control switch closes the cranking circuit the solenoid is energized, shifting the starting motor pinion into mesh with the engine flywheel ring gear and closing the main contacts located inside the solenoid. Battery current is then directed to the motor causing the armature to rotate. Cranking torque is transmitted by the clutch from the starting motor armature to the engine flywheel ring gear.

a. Removal and Dissembly.

(1) *Removal.* Remove the starter assembly as instructed in paragraph 197.

(2) *Disassembly.*

(*a*) Remove screw (7, fig. 40) and lockwashers (6), attaching solenoid switch (9) to housing (15). Remove solenoid and spring (10).

(*b*) Unscrew and remove two bolts (1) and screws (22) and washers (21). Remove drive housing (19), bushing (18), clip (17) and pinion stop (16).

(*c*) Remove snap ring (14) and shift lever stud (20).

(*d*) Remove shift lever housing (15). Pull pin (13) and release plunger assembly (11) from lever assembly (12). Remove clutch (23).

(*e*) Remove collar (2) and brake washer (3). Pull armature assembly (4) from within coil assembly.

(*f*) Remove brushes (27), brush spring (25) and brush holder (26).

(*g*) Do not remove pole shoes (29), field coils or coil assembly unless replacement parts are needd.

b. Cleaning, Inspection, Repair, and Testing.

(1) *Cleaning.*

(*a*) Use a cloth dampened with an approved solvent to wipe all dust, oil and other foreign material from the brush plates, end frames and armature and field assemblies.

(*b*) Use filtered compressed air to blow dust and dirt from the crevices of the armature and field windings.

(*c*) Secure the armature in a lathe with the armature spinning, hold a sheet of No. 000 sandpaper against the commutator until the copper is bright and smooth.

(2) *Inspection.*

(*a*) Examine field frame assembly for cracks or warping. Inspect armature shaft end for damage or wear.

(*b*) Examine clutch for broken or cracked teeth.

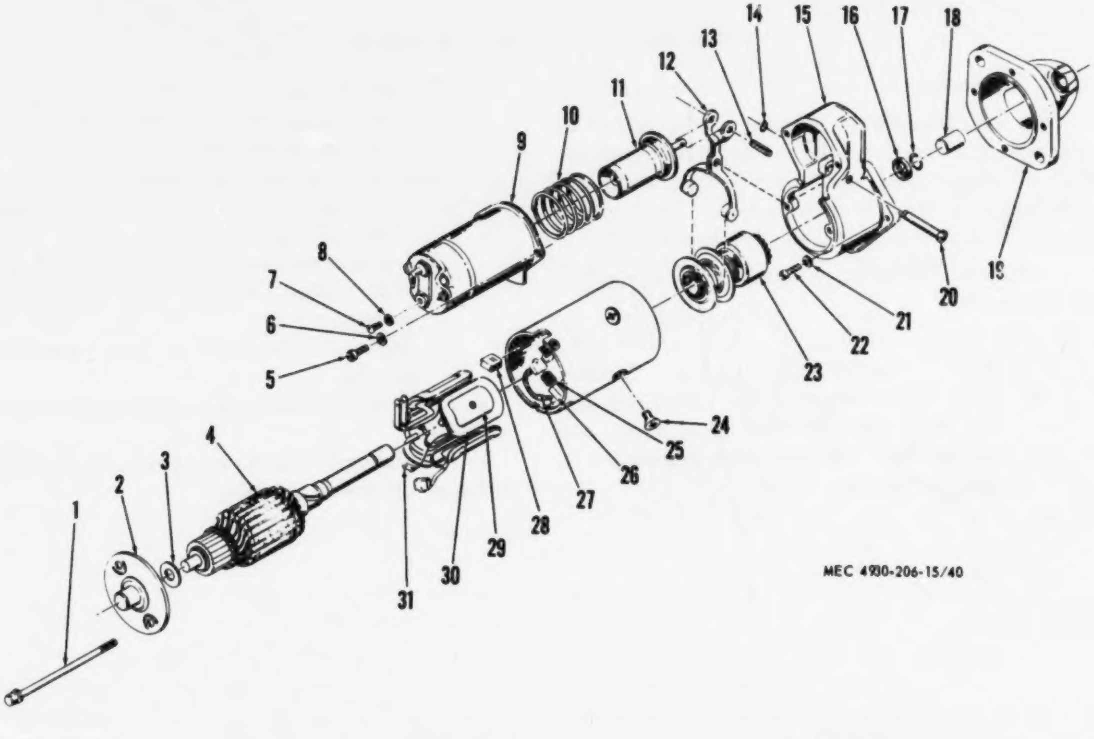
(*c*) Examine field coils for worn, burned and frayed insulation. Be certain connections between field coils are secure. Repair connections if necessary.

(*d*) Inspect springs for distortion or fatigue. Examine brushes for damage or excessive wear.

(3) *Repair.*

(*a*) Replace armature or coils if tests indicate shorts.

(*b*) If commutator is out-of-round in excess of 0.001 inch, turn down on lathe.



1	Bolt (2)
2	Collar
3	Brake washer
4	Armature
5	Fillister head screw (2)
6	Lockwasher (2)
7	Round head screw
8	Lockwasher
9	Solenoid switch
10	Plunger spring
11	Plunger assy
12	Lever assy
13	Shift lever pin
14	Snap ring
15	Shift lever housing
16	Pinion stop
17	Pinion clip
18	Bushing
19	Drive housing
20	Shift lever stud
21	Lockwasher (4)
22	Housing screw (4)
23	Clutch
24	Pole shoe screw (4)
25	Brush spring
26	Brush holder
27	Starter brush (2)
28	Grommet
29	Pole shoe (4)
30	Field coil
31	Coil assy

Figure 40. Starter assembly.

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(*c*) Replace damaged or worn solenoid switch.

(*d*) Replace all parts indicating wear, cracks damage.

(*e*) Undercut mica insulation between the commutator bars to a depth of 1/32-inch. When undercutting mica, the cut should be square and free of burrs.

(4) *Testing.*

(*a*) Check brush holder for shorts to ground using a test light.

(*b*) Test armature assembly for open coils and shorts to ground, or between coils by using a test light.

(*c*) Check field coils for open circuits and shorts to ground, or between coils using a test light.

c. Reassembly and Installation.

(1) Reassembly is the reverse of disassembly. Refer to figure 40.

(2) Install the starter assembly as instructed in paragraph 197.

d. No-Load Test.

(1) Connect the starting motor in series with a fully charged battery, an ammeter capable of reading several hundred amperes and a variable resistor. Also connect a voltmeter from the motor terminal to the motor frames. An rpm indicator is necessary to measure armature speed.

(2) Obtain the specified voltage of 23 volts by varying the resistance unit. The current draw must be 90 amperes maximum and the correct speed at these readings must be a maximum of 10, 700 rpm.

Section IV. CLUTCH ASSEMBLY

204. General

The clutch assembly consists of the clutch retainer, clutch shaft, and the clutch. The clutch consists of center, end, and sliding clutch disks and operates as a variable speed pulley. The clutch is hand operated by means of the fork handle.

a. Removal. Refer to paragraph 133 for removal of the clutch.

b. Disassembly.

(1) Remove handle (15, fig. 41). Unscrew and remove set screw (4). Slide end disk (5), snap rings (8), idler bearings (9) and center disk (10) from hub assembly (7). Remove key (6).

(2) Remove snap ring (19), snap ring (18), clutch collar (14) cam sleeve (13) and balls (11) from sliding disk (12).

c. Cleaning, Inspection, and Repair.

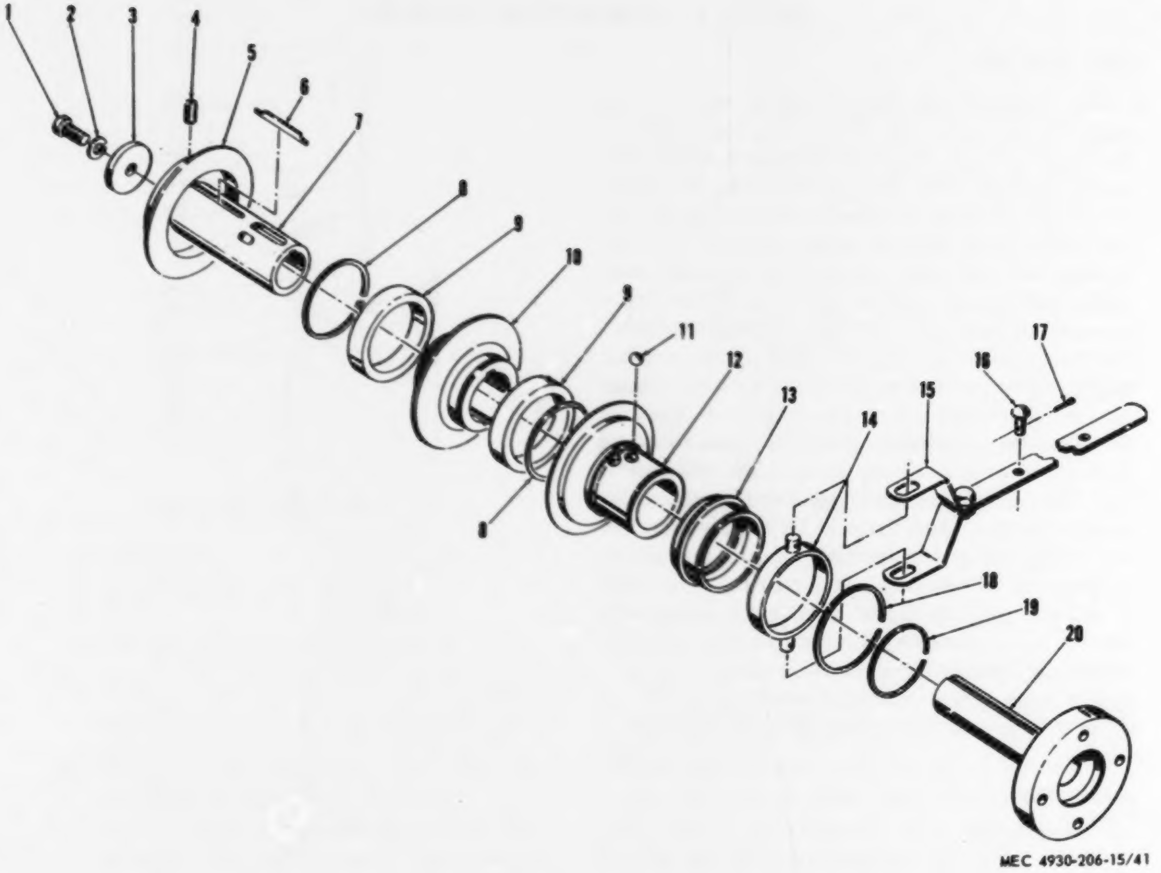
(1) Clean all parts by flushing in kerosene. Clean all dust and lint from parts.

(2) Inspect for wear and damage on all three clutch disks. Inspect balls for flatness or scoring.

(3) Replace all damaged or worn parts at assembly.

d. Reassembly. Reassembly is the reverse of disassembly.

e. Installation. Refer to paragraph 133 for installation of the clutch assembly.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MEC 4930-206-15/41

1	Cap screw
2	Lockwasher
3	Clutch retainer
4	Setscrew
5	End disc
6	Locking key
7	Hub assy
8	Snap ring (2)
9	Idler bearing (2)
10	Center disc
11	Ball (7)
12	Sliding disc
13	Cam sleeve
14	Clutch collar
15	Fork handle
16	Rivet
17	Cotter pin
18	Snap ring
19	Snap ring
20	Clutch shaft

Figure 41. Retainer and clutch assembly.

CHAPTER 8
COMPRESSOR REPAIR INSTRUCTIONS

Section I. COMPRESSOR ASSEMBLY

203. General

The compressor on the lubricating unit is a two stage, 16 cfm unit, with a disk type valve system. The twin-cylinder construction gives a higher discharge pressure with less consumption of power. The larger cylinder is a low pressure cylinder and the smaller is the high pressure cylinder. The low pressure, or first stage, exhausts air into an intercooler which cools the air before it enters under pressure (45 psi) into the high pressure cylinder. The compressor is equipped with an oil monitor which affords maximum protection against damage due to insufficient oil in the crankcase, however the splash-type lubrication system provides adequate lubrication, even if the oil level in the reservoir is low. The compressor is equipped with an automatic pressure control which unloads the compressor when the tank pressure has reached 175 psi, and allows compression to resume when pressure has dropped to 145 psi. A centrifugal unloader automatically opens a valve releasing compression from cylinders, inter-cooler and after-cooler each time the compressor stops. Air is exhausted outside the crankcase where moisture cannot contaminate the lubricant.

a. Removal. Remove the compressor assembly as instructed in paragraph 191.

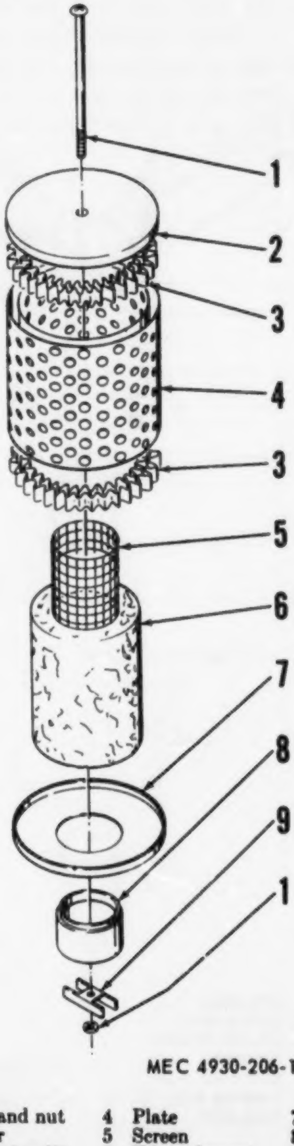
b. Disassembly.

(1) Unscrew and remove tubes (1, 54, 69, and 83, fig. 26). Remove fitting (2), compression nut (3), compression nuts (53), elbow (52) and tee and nut assemblies (49).

(2) Unscrew and remove compression nuts (71 and 85). Remove fittings (72 and 84).

(3) Remove compression nuts (11) and ferrules (10) releasing intercooler tube (44). Remove compression nuts (13) and ferrules (12) releasing tube (14). Remove tubes.

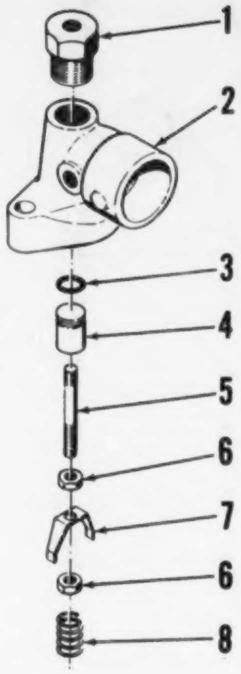
(4) Unscrew and remove setscrew (51). Remove air cleaner assembly (6). Disassemble air cleaner as indicated in figure 42.



MEC 4930-206-15/42

1	Bolt and nut	4	Plate	7	Cover
2	Cover	5	Screen	8	Ferrule
3	Separator (2)	6	Filter element	9	Clamp

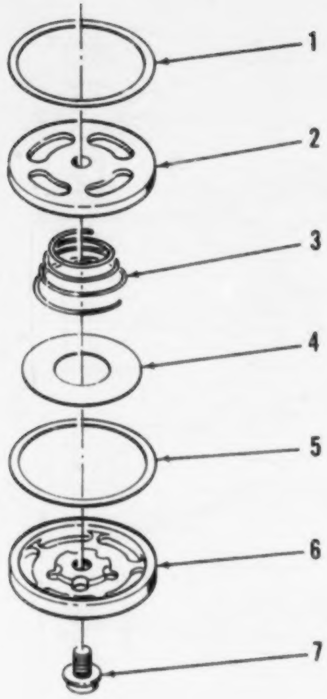
Figure 42. Compressor air cleaner assembly.



MEC 4930-206-15/43

1 Cylinder body
2 Manifold
3 O-ring packing
4 Piston
5 Piston rod
6 Hex nut (2)
7 Claw
8 Spring

Figure 43. Compressor manifold assembly.



MEC 4930-206-15/44

1 Gasket
2 Seat
3 Spring
4 Disc
5 Gasket
6 Cage
7 Fastener

Figure 44. Compressor valve assembly.

(5) Remove two hex nuts (4) and remove manifold assembly (5). Disassemble manifold assembly as indicated in figure 43.

(6) Remove valve assembly (50) and disassemble as indicated in figure 44.

(7) Remove nuts (4) and lift off manifold (47). Remove valve assembly (46). Disassemble valve assembly as indicated in figure 45.

(8) Remove two nuts (4) and lift off manifold (7). Remove and disassemble valve assembly (8). Refer to figure 44 for valve disassembly.

(9) Remove two nuts (4) and lift off manifold assembly (48). Disassemble manifold assembly as indicated in figure 46. Remove valve (45) and disassembly as shown in figure 47.

(10) Unscrew and remove studs (9). Unscrew and remove six hex nuts (43) attaching cylinder (42). Remove cylinder and gasket (41).

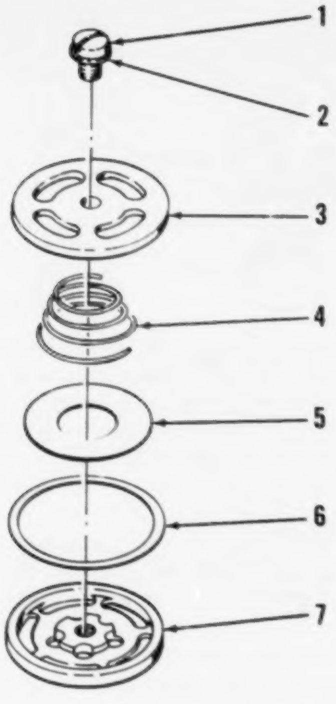
(11) Remove three compression rings (15) and two oil rings (16). Remove retaining rings (17) and pull piston pin (18) releasing piston (19). Remove piston.

(12) Remove bushing (20). Remove two bolts (22), lockwashers (26) and nuts (27), releasing connecting rod (21). Remove connecting rod, shims (23), bearing (24), and oil scoop (25).

(13) Remove three compression rings (40) and oil ring (39). Remove rings (36) and pull pin (37) attaching piston (38). Remove piston. Unscrew and remove two bolts (34), lockwashers (30) and nuts (29) attaching connecting rod (33). Remove connecting rod.

(14) Remove shims (32), bearing (31) and slinger (28).

(15) Remove nut (109) and bolt (111) attaching flywheel (110). Remove flywheel and key (63).



MEC 4930-206-15/45

1 Fillister head screw
2 Lockwasher
3 Seat
4 Spring
5 Disc
6 Gasket
7 Gage

Figure 45. Compressor valve assembly.

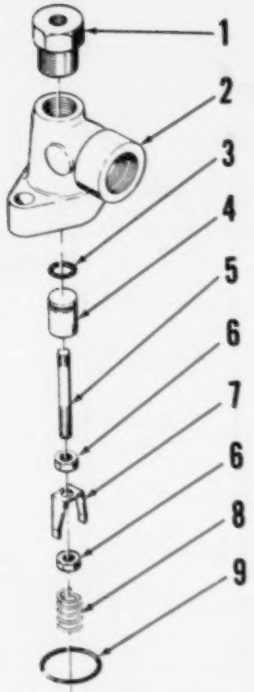
(16) Remove pipe plug (114) and fitting (115). Unscrew and remove relief valve (55). Refer to figure 48 for disassembly of relief valve.

(17) Remove 12 hex head screws (70) and pull plates (58) and gaskets (59) from crankcase (113).

(18) Remove valve cap (86), spring (87), ball (88), valve body (89) and gasket (90). Remove valve plunger (91) and sleeve (92).

(19) Unscrew and remove muffler (93). Remove six screws (82) attaching cover (81). Remove cover and gasket (80). Remove baffle (79). Remove sleeve (94), spring (95) and spring plate (78).

(20) Unscrew and remove screw (77). Pull pins (96) releasing two weights (76) and springs (75). Remove spindle (97) and washer (98) from housing (99).



MEC 4930-206-15/46

1 Cylinder body
2 Manifold
3 O-ring packing
4 Piston
5 Piston rod
6 Hex nut (2)
7 Claw
8 Spring
9 Gasket

Figure 46. Compressor manifold assembly.

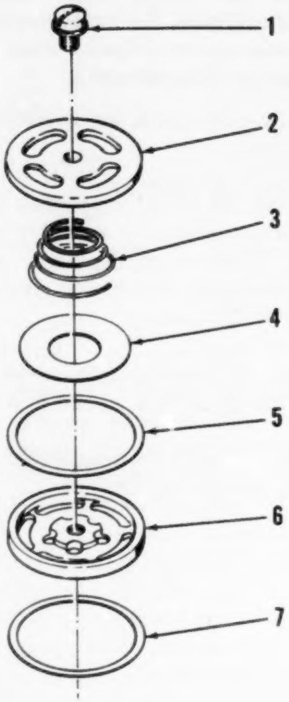
(21) Unscrew and remove four hex screws (74) and lockwashers (73). Remove housing (99) and gasket (100).

(22) Remove oil gage (66) and seal (65) from crankcase (113).

(23) Pull crank shaft (64) and two bearing cones (61) and bearing cups (60) from inside crankcase (113).

(24) Unscrew and remove cap (67), nipple (68) and two pipe plugs (62 and 114) from crankcase (113).

(25) Remove four cap screws (112), lockwashers (104) and nuts (105) attaching crankcase (113) to air receiver tank (103). Remove crankcase.



1	Fastener	5	Gasket
2	Seat	6	Gage
3	Spring	7	Gasket
4	Disc		

Figure 47. Compressor valve assembly.

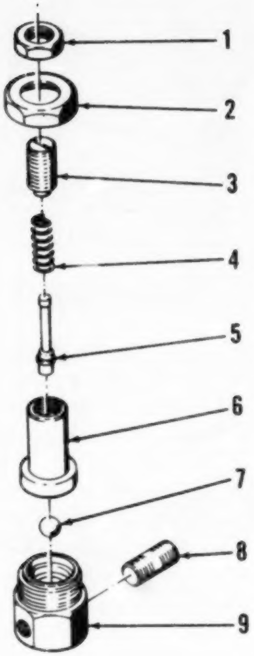
(26) Unscrew and remove safety valve (106) and air gage (108) from air receiver tank (103). Remove elbow (107). Remove check valve (101) from nipple (102). Refer to figure 49 for disassembly of check valve.

c. Cleaning.

(1) Wash all parts of the compressor assembly, except bearings and gaskets in dry cleaning solvent. Dry the parts with clean, lint-free cloths and place in covered containers. Use a small brush to swab out the lubricating oil passages in the crankcase.

(2) Wash bearings in filtered dry cleaning solvent, then dry using the vacuum air method. Lubricate the bearings immediately after cleaning.

Note. Avoid touching clean bearings with bare fingers; do not spin bearing while dry.



1	Lock nut	4	Spring	7	Ball
2	Collar	5	Stem	8	Stud
3	Adjusting screw	6	Sleeve	9	Body

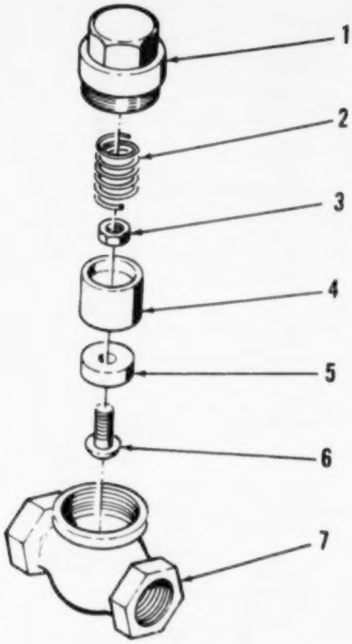
Figure 48. Compressor relief valve assembly.

d. Inspection.

(1) Perform a thorough general inspection of all parts of the compressor assembly, checking particularly for cracked and chipped castings, damaged screw threads, and finished surfaces that are scored, pitted, or scratched.

(2) Inspect connecting tube assemblies and fittings for worn or damaged screw threads, cracks, dents, sharp bends and other defects. Pay particular attention to the flared ends of the tubes since cracking is most apt to occur at the root of the flare. Do not attempt to reclaim a connecting tube assembly by replacing component parts.

(3) Inspect cylinder bores, pistons, connecting rods and pins for excessive wear, scoring and other indications of damage. Discard all damaged and excessively worn parts.



MEC 4930-206-15/49

1 Cap
2 Spring
3 Hex nut
4 Plunger
5 Disc
6 Round head screw
7 Body

Figure 49. Compressor check valve assembly.

(4) Inspect the valves, valve seats, valve springs and stops for nicks, scoring, burning, warping and noticeable wear. Discard all worn or damaged parts.

(5) If replacement parts are available discard all gaskets.

e. Repair. The repair of component parts and subassemblies of the compressor assembly should not be attempted. Discard all damaged, worn and questionable parts and install new items during reassembly of the equipment.

f. Reassembly. Reassembly is the reverse of disassembly. Refer to figure 26 as an aid in reassembly.

g. Installation. Install the compressor assembly as instructed in paragraph 191.

CHAPTER 9
LUBRICATING EQUIPMENT REPAIR INSTRUCTIONS

Section I. LUBRICATING UNIT PUMPS

206. General

The air powered lubricant pumps are mounted opposite the hose reel bank assembly. A 46 to 1 ratio pump is mounted on the center lubricant container and one 11 to 1 ratio pump is mounted on each of the two outside lubricant containers. The pumps are heavy-duty, reciprocating, industrial type pumps. Four control valves are attached to the four lubricant hoses leading from the pumps. Two high pressure control valves are attached to the hose from the 46 to 1 ratio pump and two low pressure control valves are attached to the hoses from the two 11 to 1 ratio pumps. The high pressure pump is used to dispense general purpose grease and operate in conjunction with the high pressure control valve. The low-pressure pumps are used to pump gear lubricant.

207. High Pressure Pump Removal and Disassembly

a. Removal. Remove the lubricant pump as instructed in paragraph 192.

b. Disassembly of Power Head.

(1) Place the pump in a vise, on the small diameter of the pump base casting.

(2) Remove the lower plate and determine the position of the piston (56, fig. 50).

(3) Using an air blower valve in the air inlet opening, force the piston (56) to the top or near top of the stroke.

(4) Remove the cylinder cap nut (5) from the air pump cylinder (1).

(5) Remove the bleeder valve (6) from trip rod (84). Do not lose ball (2).

(6) Using a padded pliers, grip the trip rod (84) and remove the cap nut (5) from the trip rod.

(7) Remove screws (80) and lockwashers (79) which secure the air pump cylinder (1) to the air pump base (13).

(8) Carefully lift the cylinder (1) vertically, from the piston (56) and base (13). Avoid tilting to insure no damage to smooth inner walls of cylinder. Remove O-rings (11 and 12).

(9) Keep hands clear of the toggle mechanism. Push down the shuttle (62) to snap the toggle mechanism into the down position.

(10) Remove lock wires (61) from air valves (54) and lower valve grommet (60).

(11) Remove the valve nut (58) and valve stem (53) with a screwdriver.

(12) Grip toggle rockers (69) with a pair of pliers and push down and inward to compress springs (68). Snap rockers out of the retraining grooves in the piston lugs.

(13) Lift the entire valve mechanism out with rod (84).

(14) Remove trip rod from the shuttle (62) and valve bar (84).

(15) Remove valve bar spring clips (66) by removing screw (64) and lock washer (65).

(16) Remove displacement rod (83) from piston (56). Remove O-ring (52) from piston.

c. Disassembly of Air Pump Assembly.

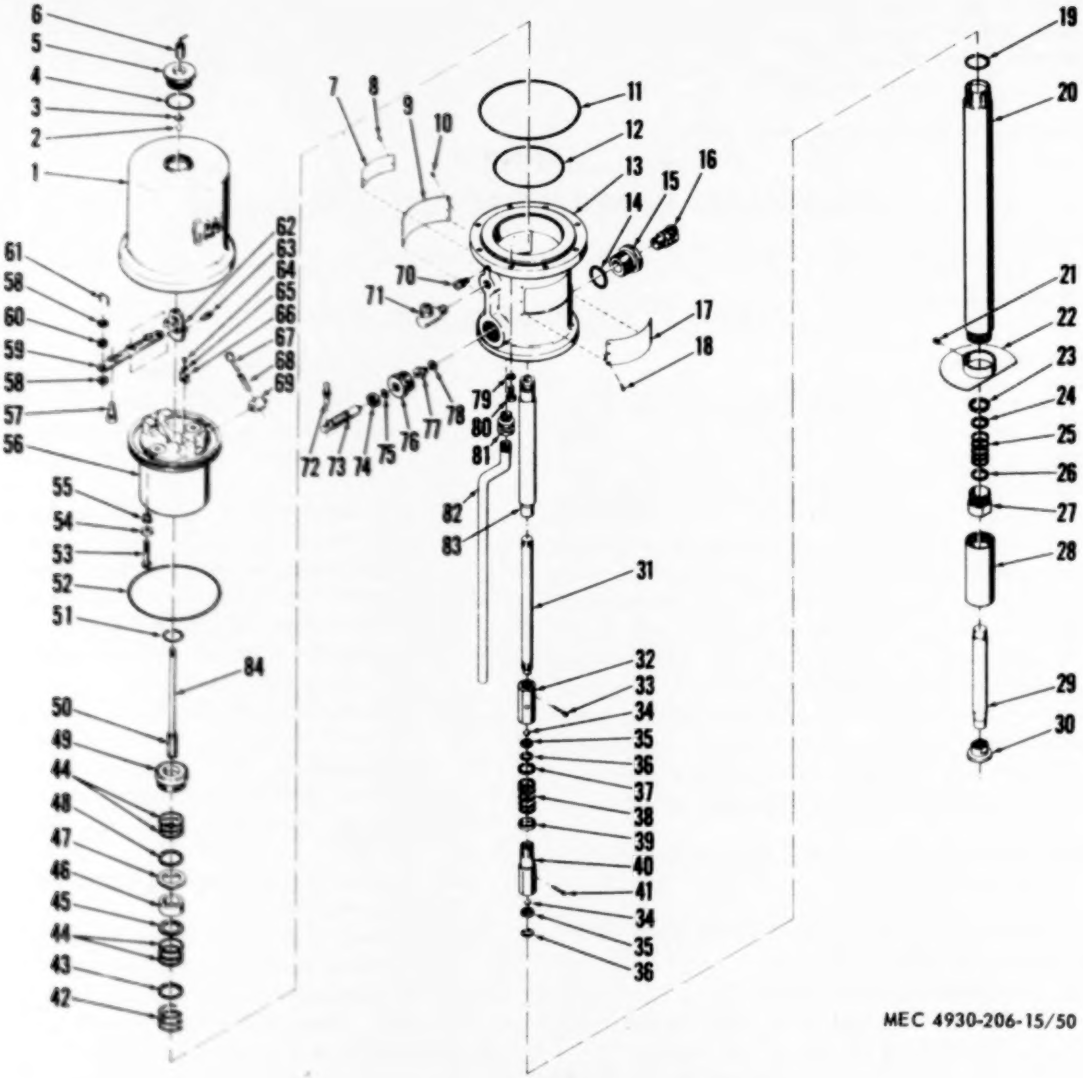
(1) Remove handle (72) from circulating valve stem (73) and remove lock nut (74) and circulating valve guide nut (76) from air pump base (13).

(2) Remove circulating valve seat (77) and copper gasket (78) and O-ring (75) from pump base (13).

(3) Remove oiler (70) from air pump base (13).

(4) Remove union assembly (16), adapter outlet (15) and gasket (14) from pump base (13).

(5) Remove packing nut (49), female gland (45), V packing (44), male gland (43), washer (47), bearing (46), compressor spring (42) from air pump base (13).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MEC 4930-206-15/50

Figure 60. High pressure lubricant pump assembly.

d. High Pressure Pump Disassembly.

(1) Remove priming cylinder (28) from riser tube (20).

(2) Insert a ¼-inch diameter rod through the holes in the priming tube (29). With an open end wrench on the flats of priming piston (30), remove the piston from the tube.

(3) Remove packing housing (27) from riser tube (20).

(4) Remove male gland (24), packings (25) and female gland (26) from packing housing and bearing (23) from the riser tube.

(5) Remove piston body (40) from coupling (32) and remove steel ball (34), seat (35), copper gasket (36), male gland (37), packings (38) and female gland (39) by removing cotter pins (33 and 41).

INDEX TO FIGURE 50

1	Air cylinder
2	Ball
3	O-ring packing
4	O-ring packing
5	Cylinder cap nut
6	Bleeder valve assy
7	Serial plate
8	Sheet metal screw (2)
9	Nameplate
10	Sheet metal screw (6)
11	O-ring packing
12	O-ring packing
13	Pump base
14	Gasket
15	Outlet adapter
16	Union assy
17	Nameplate
18	Sheet metal screw (6)
19	Gasket
20	Riser tube
21	Setscrew
22	Plate assy
23	Primer pump bearing
24	Male gland
25	O-ring packing (5)
26	Female gland
27	Packing housing
28	Priming cylinder
29	Priming tube
30	Priming piston
31	Pump rod
32	Rod coupling
33	Cotter pin
34	Ball (2)
35	Valve seat (2)
36	Gasket (2)
37	Male gland
38	O-ring packing (5)
39	Female gland
40	Piston body
41	Cotter pin (3)
42	Spring
43	Male gland (2)
44	Ring packing (10)
45	Female gland (2)
46	Pump bearing
47	Washer
48	Packing nut
49	Hex nut
50	Rod guide
51	Gasket
52	O-ring packing
53	Lower valve stem (2)
54	Air valve
55	Valve seat (2)
56	Power head piston
57	Upper valve
58	Valve nut (4)
59	Valve bar
60	Grommet (2)
61	Lock wire (2)
62	Shuttle toggle
63	Toggle pin (2)
64	Machine screw (2)
65	Lockwasher (2)
66	Spring clip (2)
67	Toggle arm (2)
68	Spring (2)
69	Toggle rocker (2)
70	Oil hole cover
71	Union assy
72	Valve handle
73	Valve stem
74	Hex nut
75	O-ring packing
76	Valve guide nut
77	Valve seat
78	Gasket
79	Lockwasher (8)
80	Cap screw (8)
81	Union assy
82	Pump tube
83	Connecting rod
84	Trip rod

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208. High Pressure Pump Cleaning, Inspection and Repair

a. Power Head.

(1) Clean all parts in an approved cleaning solvent.

(2) Replace rubber valves.

(3) Inspect cylinder and piston for scored surfaces. Replace if necessary.

(4) Inspect and replace any worn or damaged parts.

b. High Pressure Air Pump.

(1) Inspect air pump base for cracks. Replace if defective.

(2) Inspect and replace defective packings and glands.

(3) Clean all parts in an approved cleaning solvent.

(4) Soak new packings in arctic oil before installation.

(5) Inspect threaded surfaces for damage.

c. High Pressure Pump.

(1) Check priming tube polished surfaces for scoring or wear. Replace if necessary.

(2) Inspect piston and piston body for defects. Replace if necessary.

(3) Replace worn packings or glands.

(4) Clean parts in approved cleaning solvent.

209. High Pressure Pump Reassembly and Installation

a. Reassembly. Reassembly is essentially the reverse of disassembly. Refer to figure 50 as an aid in reassembly.

b. Installation. Refer to paragraph 192 for installation of the high pressure pump assembly.

210. Low Pressure Pump Removal and Disassembly

a. Removal. Refer to paragraph 192 for removal instructions of the low pressure pump.

b. Disassembly of Power Head.

(1) Place the pump in a vise, on the small diameter of the pump base casting.

(2) Remove the lower plate and determine the position of piston (47, fig. 51).

(3) Using an air blower valve in the air inlet opening, force the piston (47) to the top or near top of the stroke.

(4) Remove cylinder cap nut (5) from air pump cylinder (1).

(5) Remove bleeder valve (6) from trip rod (41). Do not lose ball (2).

(6) Using a padded pliers, grip the trip rod (41) and remove cap nut (5) from the trip rod.

(7) Remove screws (72) and lockwashers (71) which secure the air pump cylinder (1) to air pump base (11).

(8) Carefully lift cylinder (1) vertically from piston (47) and base (11). Avoid tilting to insure no damage to smooth inner walls of cylinder. Remove O-rings (9 and 10) from vase (11).

(9) Keep hands clear of the toggle mechanism. Push down shuttle (53) to snap toggle mechanism into the down position.

(10) Remove lock wire (52) from air valves (45) and lower valve grommet (51).

(11) Remove valve nut (49) and valve stem (44) with a screw driver.

(12) Grip toggle rockers (60) with a pair of pliers and push down and inward to compress springs (59). Snap rockers out of the retaining grooves in piston lugs.

(13) Lift the entire valve mechanism out with trip rod (41).

(14) Remove trip rod from the shuttle (53) and valve bar (50).

(15) Remove valve bar spring clips (57) by removing screw (55) and lockwasher (56).

(16) Remove displacement rod (21) from piston (47).

c. Low Pressure Air Pump Disassembly.

(1) Remove air pump from the power head.

(2) Remove the lower plate (69) from the air pump base (11).

(3) Remove packing nut (40) from piston (47).

(4) Remove female gland (37), two packings (36), male gland (35), washer (39), bearing (38), female gland (37), three packings (36), male gland (35), and compression spring (34) from piston (47) and displacement rod (21).

(5) Remove O-ring (43) from piston (47).

(6) Remove handle (61) from valve stem (75).

(7) Remove lock nut (62) from valve stem (75) and remove valve guide nut (64).

(8) Remove valve stem (75), O-ring (63) from valve seat (65).

(9) Remove valve seat and copper gasket (66) from air pump base (11).

(10) Remove oiler (67) from the air pump base (11).

(11) Remove union (13) and bushing (12).

d. Low Pressure Pump Disassembly.

(1) Remove foot valve body (19), copper gasket (16) and steel ball (17) from riser tube (15). Remove stop pin (18).

(2) Remove riser tube (15) from the air pump base (11) by turning counterclockwise.

(3) Remove drain back tube (74) and union (73) from air pump base.

(4) Remove ball seat (33) from fluid piston body (25) and remove steel ball (26), spreader washer (28), leather piston cup (29), leather cup (30) and O-ring (31) from body.

(5) Remove lock nut (24) from connecting rod (23).

(6) Remove cotter pin (22) and connecting rod (23) from displacement rod (21).

211. Low Pressure Pump Cleaning, Inspection, and Repair

a. Power Head. Refer to paragraph 208*a*.

b. Low Pressure Air Pump.

(1) Inspect the air pump base for cracks and damaged threaded surfaces.

INDEX TO FIGURE 51

1	Air cylinder	26	Ball	51	Grommet (2)
2	Ball	27	Piston washer	52	Lock wire (2)
3	O-ring packing	28	Spreader washer	53	Shuttle toggle
4	O-ring packing	29	Cup packing (2)	54	Toggle pin (2)
5	Cylinder cap nut	30	Spring cup (2)	55	Round head screw (2)
6	Bleeder valve assy	31	O-ring packing	56	Lockwasher (2)
7	Sheet metal screw (2)	32	Seat spacer	57	Spring clip (2)
8	Sheet metal screw (6)	33	Piston seat	58	Toggle arm (2)
9	O-ring packing	34	Spring	59	Spring (2)
10	O-ring packing	35	Male gland (2)	60	Toggle rocker (2)
11	Pump base	36	O-ring packing (5)	61	Valve stem handle
12	Bushing	37	Female gland (2)	62	Hex nut
13	Union assy (2)	38	Pump bearing	63	O-ring packing
14	O-ring packing	39	Lockwasher	64	Valve guide nut
15	Riser tube	40	Lock nut	65	Valve seat body
16	Gasket	41	Trip rod assy	66	Gasket
17	Ball	42	Gasket	67	Oil hole cover
18	Pall stop pin	43	O-ring packing	68	Nameplate
19	Foot body	44	Lower valve stem (2)	69	Nameplate
20	Sheet metal screw (6)	45	Air valve (2)	70	Nameplate
21	Connecting rod	46	Valve seat (2)	71	Lockwasher (8)
22	Cotter pin	47	Power head piston	72	Cap screw (8)
23	Connecting rod	48	Pump valve	73	Union
24	Hex nut	49	Valve nut (4)	74	Drain tube
25	Piston body	50	Valve bar	75	Valve stem

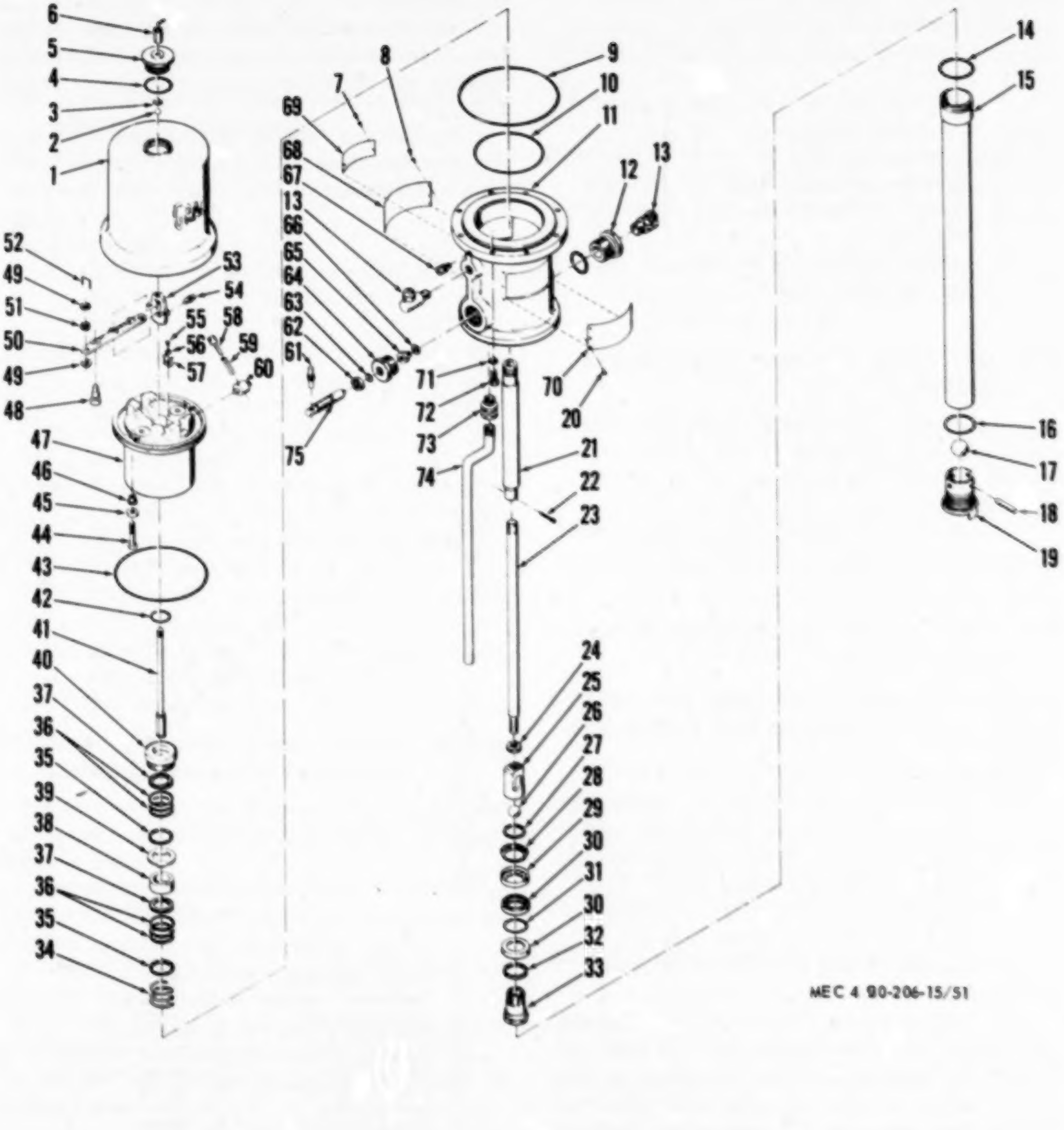
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Figure 51. Low pressure lubricant pump assembly.

(2) Replace defective packing. When replacing packing, replace glands.

(3) Soak new packing in arctic oil before installation.

(4) Clean all parts in approved cleaning solvent.

c. Low Pressure Pump.

(1) Clean all parts in approved cleaning solvent.

(2) Inspect steel balls for wear or pits. Replace if defective.

(3) Inspect riser tube for cracks or damaged threaded surfaces. Replace if necessary.

(4) Inspect leather piston cups and replace if defective.

(5) Inspect all threaded surfaces. If dama beyond repair, replace.

212. Low Pressure Pump Reassembly a Installation

a. Reassembly. Reassembly of the low press pump assembly is essentially the reverse of d assembly. Refer to figure 51, as an aid in assembly.

b. Installation. Install the low pressure pur assembly as instructed in paragraph 192.

213. High Pressure Control Valve Remov and Disassembly

a. Removal. Remove the two high pressu control valves by unscrewing from the two grea lubricant reel hoses (fig. 10).

b. Disassembly.

(1) Remove bushing (18, fig. 52), gasket (1 and strainer (20). Unscrew and remov lower body (21). Remove spring seat (22 spring (23) and valve stem (24).

(2) Remove sleeve (25), push rod (26) an valve seat (27) from upper body (7).

(3) Unscrew and remove adjusting screw (4) and lock nut (3).

(4) Pull cotter pin (5) and pin (1). Remove links (2) and handle (6). Remove nut (31), packing nut (30), three packings (29) and gland (28) from upper body (7).

(5) Unscrew shell (17) and remove coupler jaw (16), plunger (15), washer (14), packing (13), washer (12), spring (11) and coupler body (10) from adapter tube (9).

(6) Unscrew adapter tube (9) and outlet adapter (8) from upper body (7).

214. High Pressure Control Valve Cleaning, Inspection and Repair

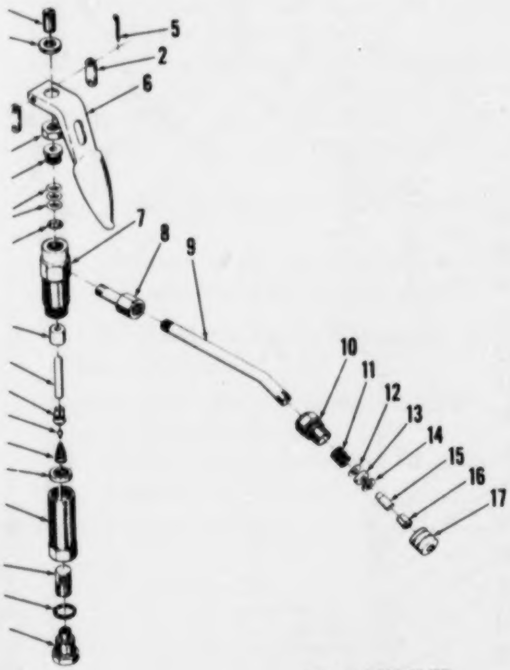
a. Clean all parts in an approved cleaning solvent.

b. Replace all packing in the control valve.

c. Inspect parts for damage or defects. Replace if necessary.

d. Check the control handle for free play. Proper free play is obtained by loosening the lock nut and backing out the adjusting screw to obtain proper free travel.

e. Replace the packing, bushing, and valve stem if grease is leaking at the point where the valve stem enters bushing.



1	Pivot pin (2)	16	Coupler jaw (3)
2	Handle link (2)	17	Shell
3	Lock nut	18	Bushing
4	Adjusting screw	19	Gasket
5	Cotter pin	20	Strainer
6	Handle	21	Lower body
7	Upper body	22	Spring seat
8	Outlet adapter	23	Spring
9	Adapter tube	24	Valve stem
10	Coupler body	25	Sleeve
11	Plunger spring	26	Push rod
12	Plain washer	27	Valve seat
13	Packing	28	Packing gland
14	Plain washer	29	Packing (3)
15	Plunger	30	Packing nut
		31	Square nut

Figure 52. High pressure control valve assembly.

215. High Pressure Control Valve Reassembly and Installation

a. Reassembly. Reassembly of the high pressure control valve assembly is the reverse of disassembly. Refer to figure 52 as an aid in reassembly.

b. Installation. Install the two high pressure valve assemblies by securing them to the two grease lubricant reel hoses (fig. 9).

216. Low Pressure Quart Control Valve Removal and Disassembly

a. Removal. Remove the quart meter control valve and quart meter from the gear oil lube hose (fig. 9).

b. Disassembly.

(1) Unscrew and remove the swivel valve (1, fig. 53) and O-ring (28) from valve assembly (27).

(2) Remove nut (20), adjusting screw (19) and pin (21). Remove roll pin (25), latch spring (26) and latch (24).

(3) Pull cotter pin (23) and pivot pin (22). Remove handle (18).

(4) Unscrew body and guide (9). Remove two O-rings (8), spring (7), O-ring (6), piston (5), valve (4) and push rod assembly (3). Remove valve seat (2).

(5) Unscrew and remove nozzle (13), remove valve spout (12) and bushing (11).

(6) Remove meter. Refer to figure 54 for disassembly of the quart meter.

(7) Remove meter elbow (14).

217. Low Pressure Quart Control Valve, Cleaning, Inspection and Repair

a. Clean all parts in approved cleaning solvent.

b. Inspect all parts for wear or leakage. Replace defective parts.

c. Inspect the control handle for free play. The setscrew and lock nut on top of the handle may be adjusted to proper free travel of the handle.

d. If the control handle is properly adjusted but still leaks from the nozzle, replace the valve.

e. If oil is leaking at the point where the valve stem enters the handle grip, replace the packing.

f. Replace all O-rings on the control valve at reassembly.

218. Low Pressure Quart Control Valve Reassembly and Installation

a. Reassembly. Reassembly of the valve is the reverse of disassembly. Refer to figure 53 as an aid in reassembly.

b. Installation. Install the low pressure control valve on the gear oil lube hose as indicated in figure 10.

219. Low Pressure Pint Control Valve Removal and Disassembly

a. Removal. Remove the low pressure control valve and pint meter from the gear oil lube hose (fig. 10).

b. Disassembly.

(1) Unscrew and remove swivel valve assembly (1, fig. 55) from the valve handle.

(2) Unscrew and remove nut (21), and adjusting screw (20). Pull pin (29) and remove latch (28) and latch spring (30).

(3) Pull pin (22) and remove washer (10) and handle (19). Remove guide (23), packing (24) and gasket (25).

(4) Unscrew and remove screw (17), spring (16), O-ring (15) and valve stem (14).

(5) Remove body (13) from tube (12). Unscrew bushing (11) from meter. Remove pint meter. For disassembly of the pint meter, refer to figure 56.

(6) Unscrew and remove meter elbow (18) from valve assembly (31).

(7) Remove body and guide (9). Remove O-rings (8), spring (7), O-ring (6), piston (5), valve (4), push rod (3) and valve seat (2) from valve (31).

220. Low Pressure Pint Control Valve Reassembly and Installation

a. Reassembly. Reassembly of the control valve is the opposite of disassembly. Refer to figure 53 as an aid in reassembly.

b. Installation. Install the valve assembly by screwing gear and lube hose assembly firmly in the valve handle swivel assembly. Refer to figure 9.

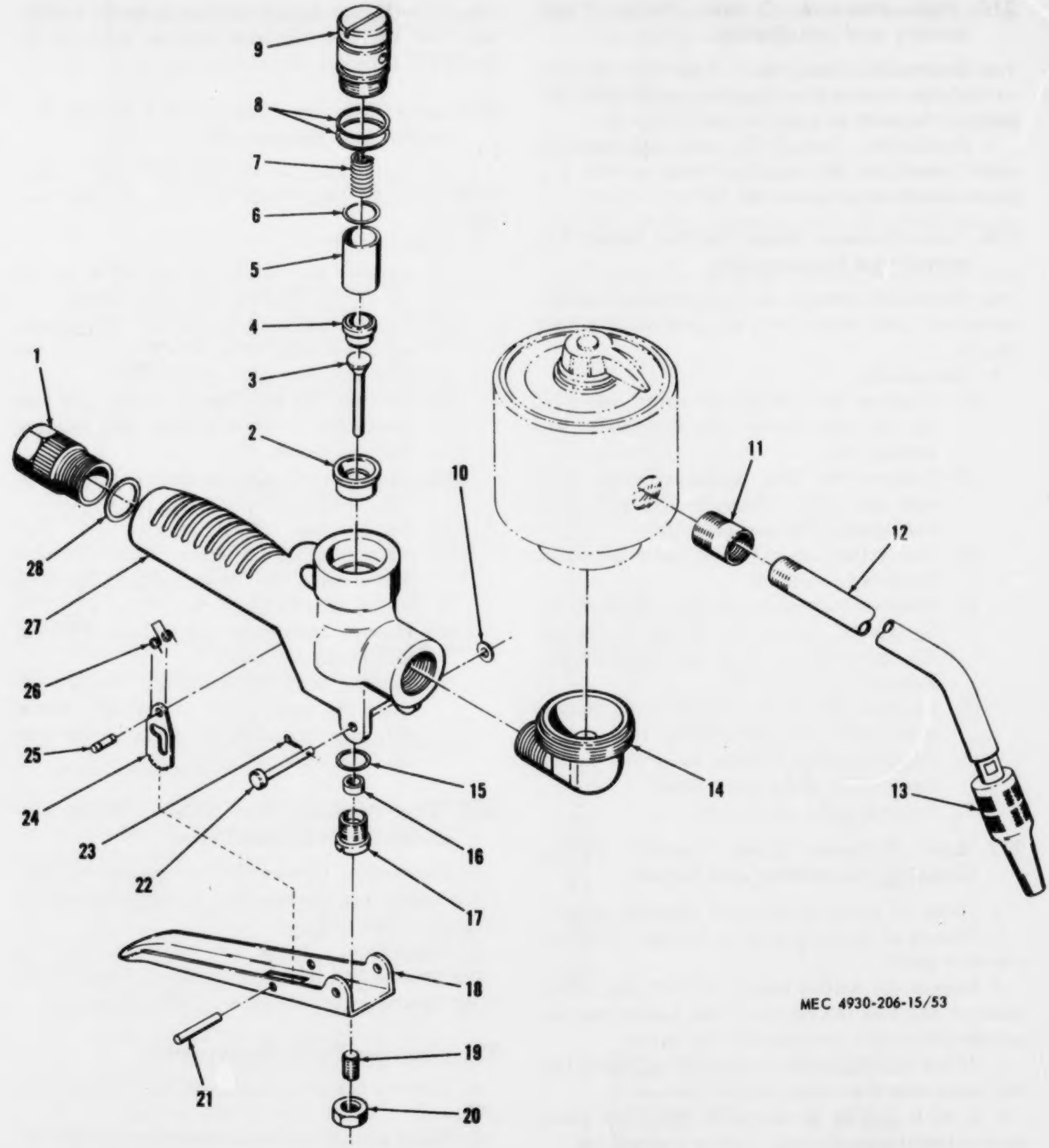
221. Transfer Pump Disassembly

a. Unscrew the air cylinder (33, fig. 57) from base (22).

b. Insert a small rod or screwdriver through the exhaust ports to prevent pulling connecting rod (2) from base (22).

c. Remove pump cap (1), compression spring (36) and gasket (35) from the top of air cylinders (33). Remove air piston assembly (34).

d. Remove air cylinder (33) from base (22). Remove washer (32), gasket (31) and spring (30). Remove stud (29) and gasket (27).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1	Swivel valve assy	8	O-ring packing (2)	15	Gasket	22	Pivot pin
2	Valve seat	9	Body and guide	16	V-packing	23	Cotter pin
3	Push rod assy	10	Flat washer	17	Rod guide	24	Handle latch
4	Control valve	11	Bushing	18	Valve handle	25	Roll pin
5	Valve piston	12	Valve spout	19	Adjusting screw	26	Latch spring
6	O-ring packing	13	Valve nozzle	20	Hex nut	27	Valve assy
7	Spring	14	Valve meter elbow	21	Roll pin	28	O-ring packing

Figure 53. Control valve assembly.

e. Pull cotter pin (26). Remove coupling (25) and second gasket (27). Remove tube (28). Remove packing (24) and washer (23).

f. Remove foot valve (8). Loosen thumbscrew (9) and remove adapter assembly (7). Unscrew and remove riser tube and assembled internal parts.

g. Remove packing gland (19), V-packings (18), bearing gland (17) and retainer (16) from base (22).

h. Unscrew and remove oil piston assembly (4) from connecting rod (2). Remove O-ring (5) from oil piston. Remove nut (3) from connecting rod.

i. Unscrew and remove union (21) from base (22). Remove valve plug (12), valve (11) and nipple (10) from base.

j. Do not remove plates (14 and 20) unless replacement parts are needed.

222. Transfer Pump Cleaning, Inspection and Repair

a. Clean all parts using an approved cleaning solvent.

b. Inspect springs for tension or defects. Replace if necessary.

c. Replace all packings at reassembly.

d. Inspect all threaded surfaces for scratches, burrs or wear. If damaged, replace defective parts.

e. Examine valve assemblies for defects. Replace if necessary.

f. Inspect pump rods and tubes for bends, breaks, or other defects which would prevent proper operation of the transfer pump.

223. Transfer Pump Reassembly

a. Reassembly of the transfer pump is the reverse of disassembly.

b. Refer to figure 57 as an aid in reassembly.

Section II. REEL BANK ASSEMBLY

224. General

The reel bank assembly consists of five reels and hoses mounted on a common base and bolted on one end of the lubricating unit. Four of the hoses are used to dispense chassis, gear, and engine oil. One hose is used for dispensing air under pressure. Each hose reel is equipped with a manual friction brake to adjust for speed of rotation for hose release.

225. Reel Bank Assembly Removal and Disassembly

a. Reel Bank Removal. Refer to paragraph 193 for removal of the reel bank assembly.

b. Lubricant Hose Disassembly.

(1) Disconnect and remove hose assemblies (51, 52, and 53, fig. 58).

(2) Unscrew and remove four unions (50) and pipe nipples (49).

(3) Remove brake handles (3) and collars (1). Pull reel pins (11) and remove shafts (36). Remove springs (37).

(4) Unscrew and remove nuts (9), lockwasher (38), shaft (10), flat washer (40), cams (41) and brakeshoes (42).

(5) Unscrew setscrew (7) and remove clamps (6). Remove two hanger supports (43) by unscrewing and removing screws (8) and nuts (2).

(6) Pull shafts (31) and remove packing nuts (30), springs (29), packing glands (28), V-packings (27) and glands (26).

(7) Unscrew and remove screws (32), nuts (47), lockwashers (48) and reel spacers (34). Remove reels (25) and hubs (33).

(8) Remove screws (4) and lift pedestal (24) and brake pedestal (46) from base (35).

c. Air Hose Reel Disassembly.

(1) Remove hose assembly, items 17, 18, and 19, figure 58.

(2) Remove brakes from air reel as described in paragraph 225 (3) and (4) above.

(3) Unscrew and remove screws (8) and nuts (2) attaching support bracket (5). Remove support bracket.

(4) Remove screws (7) attaching clamps (6). Remove clamps. Pull shaft (23).

(5) Unscrew and remove packing nut (22), V-packing (20) and springs (21).

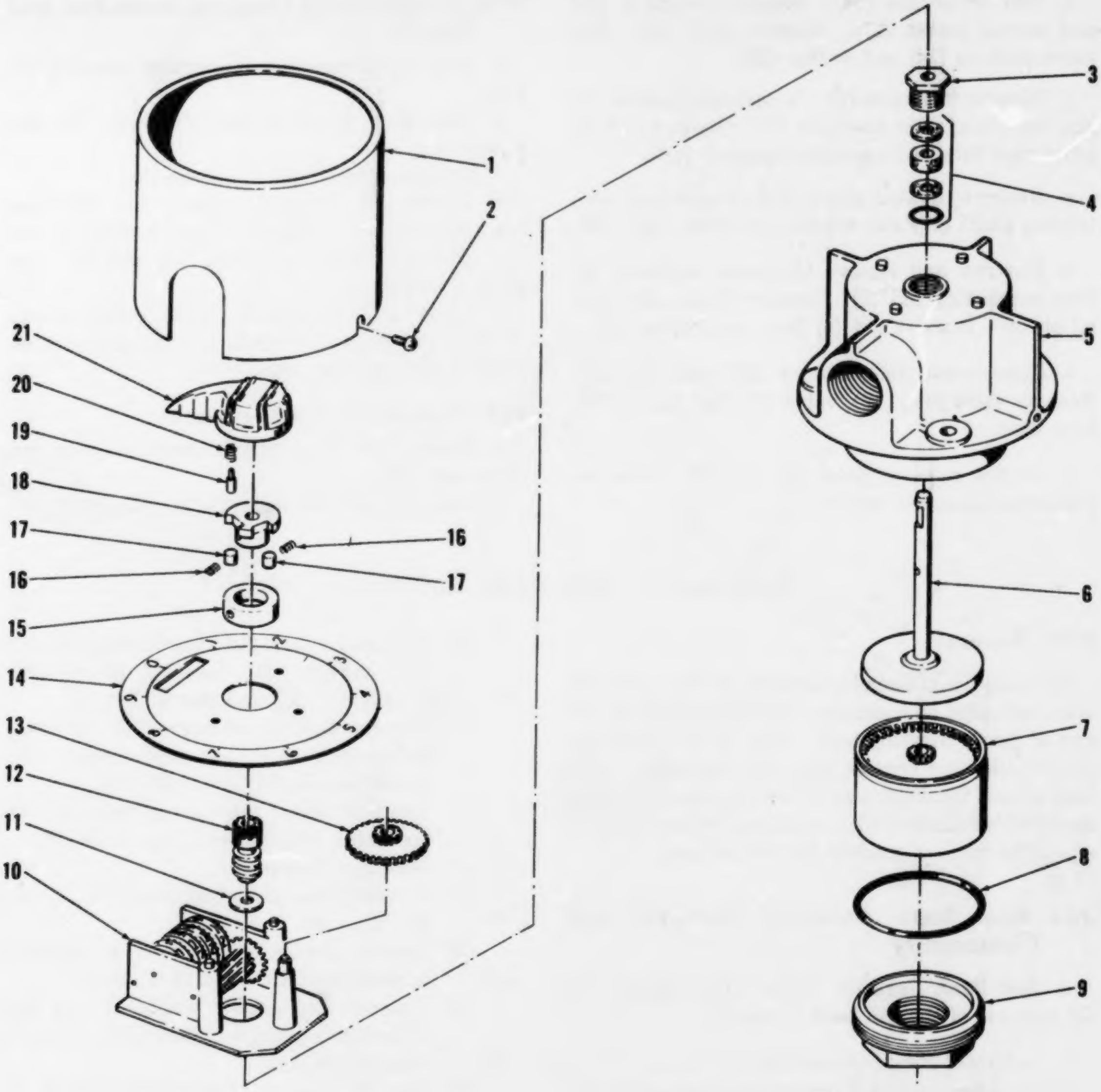
(6) Unscrew and remove union (16) and nipple (15) from reel hub (45).

(7) Remove screws (54), nuts (12) lockwashers (13) and spacers (44). Remove reels (14) and reel hub (45).

226. Reel Bank Assembly Cleaning, Inspection and Repair

a. Clean all parts in an approved cleaning solvent.

b. Inspect leather packings, replace if necessary.



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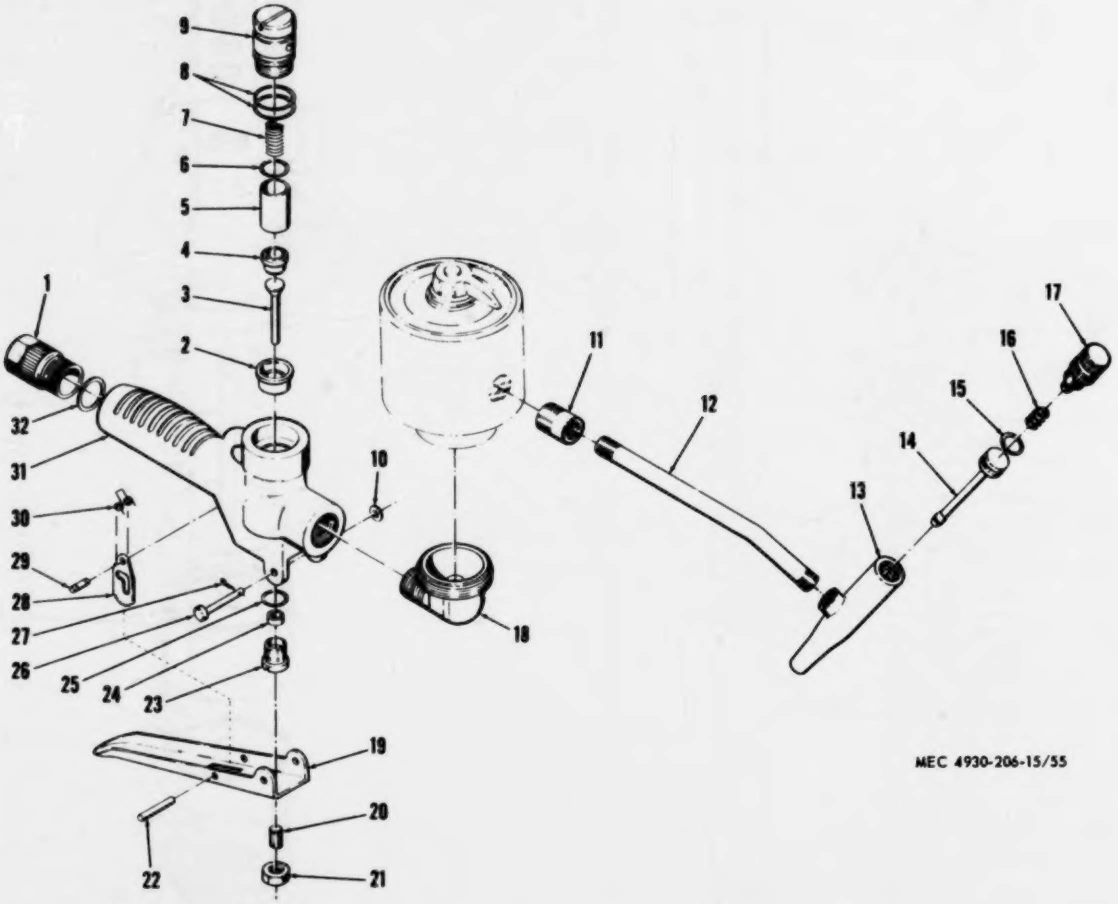
1 Meter shroud
2 Shroud screw
3 Gland nut
4 Packing assy
5 Housing
6 Gear assy
7 Piston assy
8 Gasket
9 Housing cap
10 Meter register
11 Pawl spacer
12 Pawl
13 Pointer gear
14 Dial assy
15 Cam sleeve
16 Roller spring (3)
17 Roller (3)
18 Lock cam
19 Plunger
20 Plunger spring
21 Knob and screw assy

Figure 54. Meter assembly.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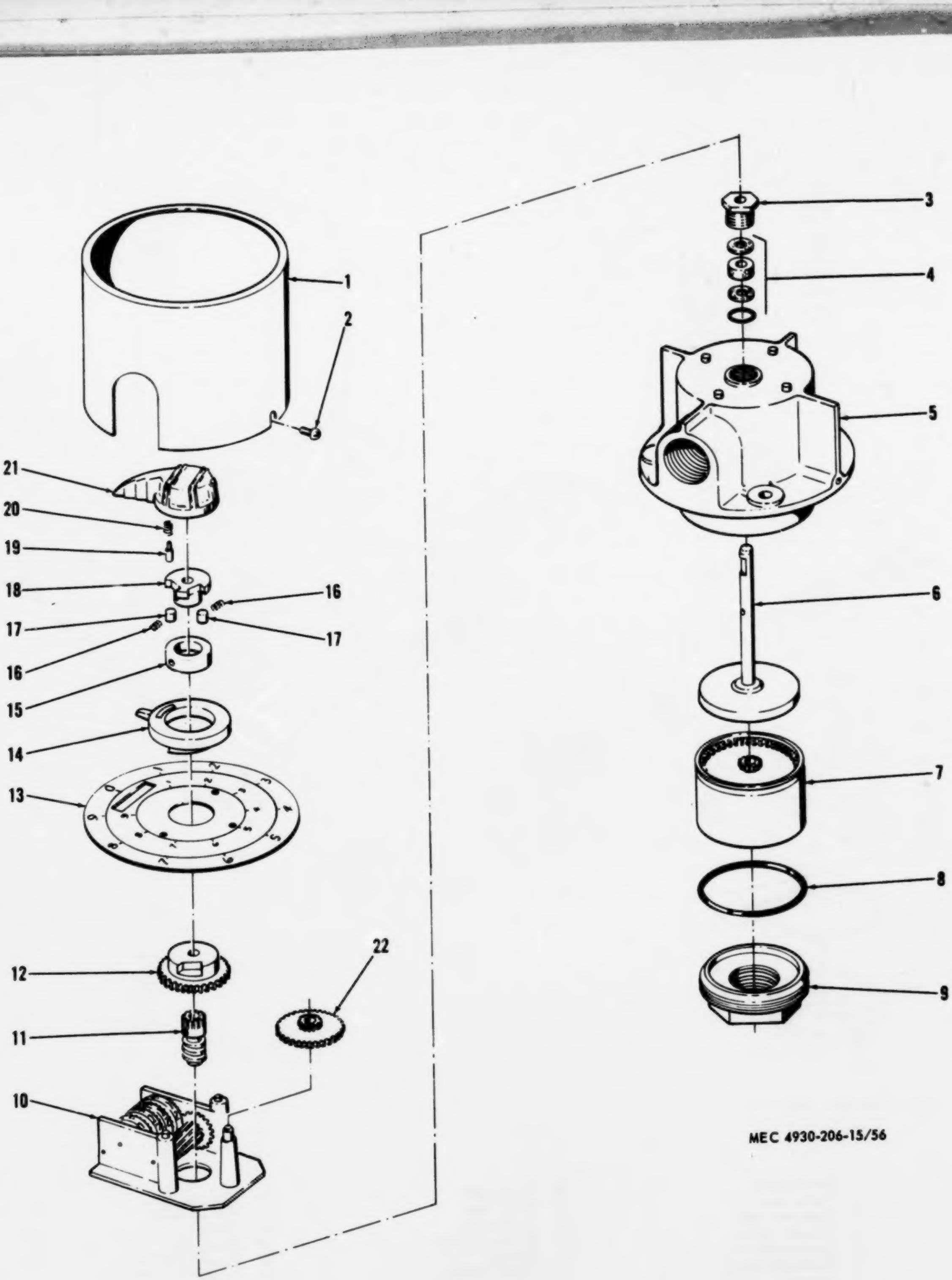
1	Swivel assy
2	Valve seat
3	Push rod assy
4	Control valve
5	Piston valve
6	O-ring packing
7	Spring
8	O-ring packing (2)
9	Body and guide
10	Flat washer
11	Bushing
12	Tube assy
13	Body assy
14	Valve stem
15	O-ring packing
16	Spring
17	Thumb screw
18	Meter elbow
19	Valve handle
20	Adjusting screw
21	Hex nut
22	Roll pin
23	Rod guide
24	Vee packing
25	Gasket
26	Pivot pin
27	Cotter pin
28	Latch
29	Roll pin
30	Latch spring
31	Valve assy
32	O-ring packing

Figure 55. Control valve assembly.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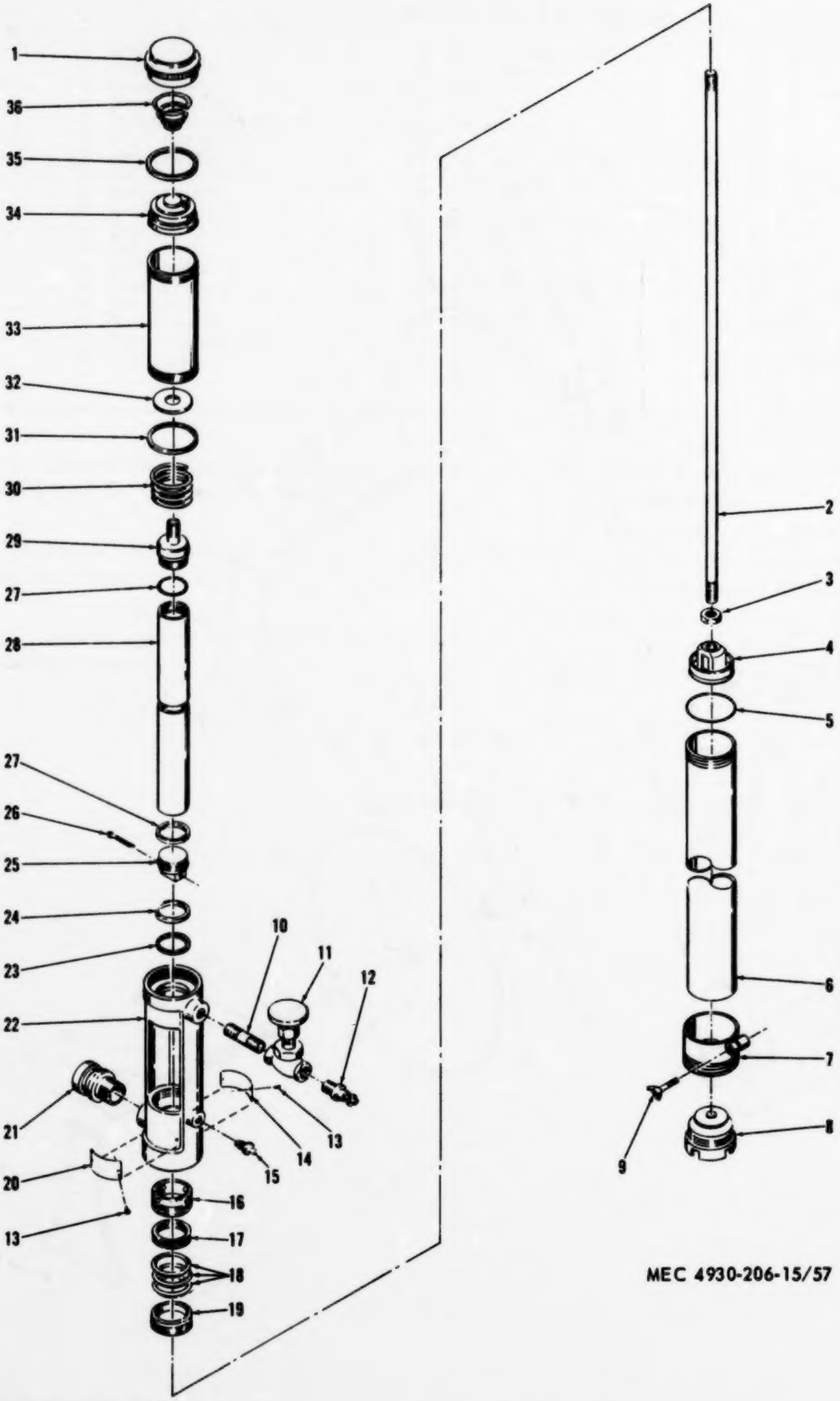
1 Meter shroud
2 Shroud screw
3 Gland nut
4 Packing assy
5 Meter housing
6 Gear assy
7 Piston assy
8 Gasket
9 Housing cap
10 Meter register
11 Gear assy
12 Pointer cam
13 Dial assy
14 Pointer assy
15 Cam sleeve
16 Roller spring (3)
17 Roller (3)
18 Reset lock cam
19 Plunger
20 Plunger spring
21 Knob and screw assy
22 Pointer gear

Figure 56. Meter assembly.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1	Cap
2	Connecting rod
3	Hex nut
4	Oil piston assy
5	O-ring packing
6	Riser tube
7	Adapter assy
8	Foot valve assy
9	Thumb screw
10	Nipple
11	Pump valve
12	Valve plug
13	Drive screw (4)
14	Approval plate
15	Grease fitting
16	Packing retainer assy
17	Bearing gland
18	V-packing (3)
19	Packing gland
20	Serial plate
21	Union assy
22	Base assy
23	Pump washer
24	V-packing
25	Coupling
26	Cotter pin
27	Gasket (2)
28	Tube
29	Stud
30	Spring
31	Gasket
32	Valve washer
33	Air cylinder
34	Air piston assy
35	Gasket
36	Pump spring

Figure 57. Transfer pump assembly.

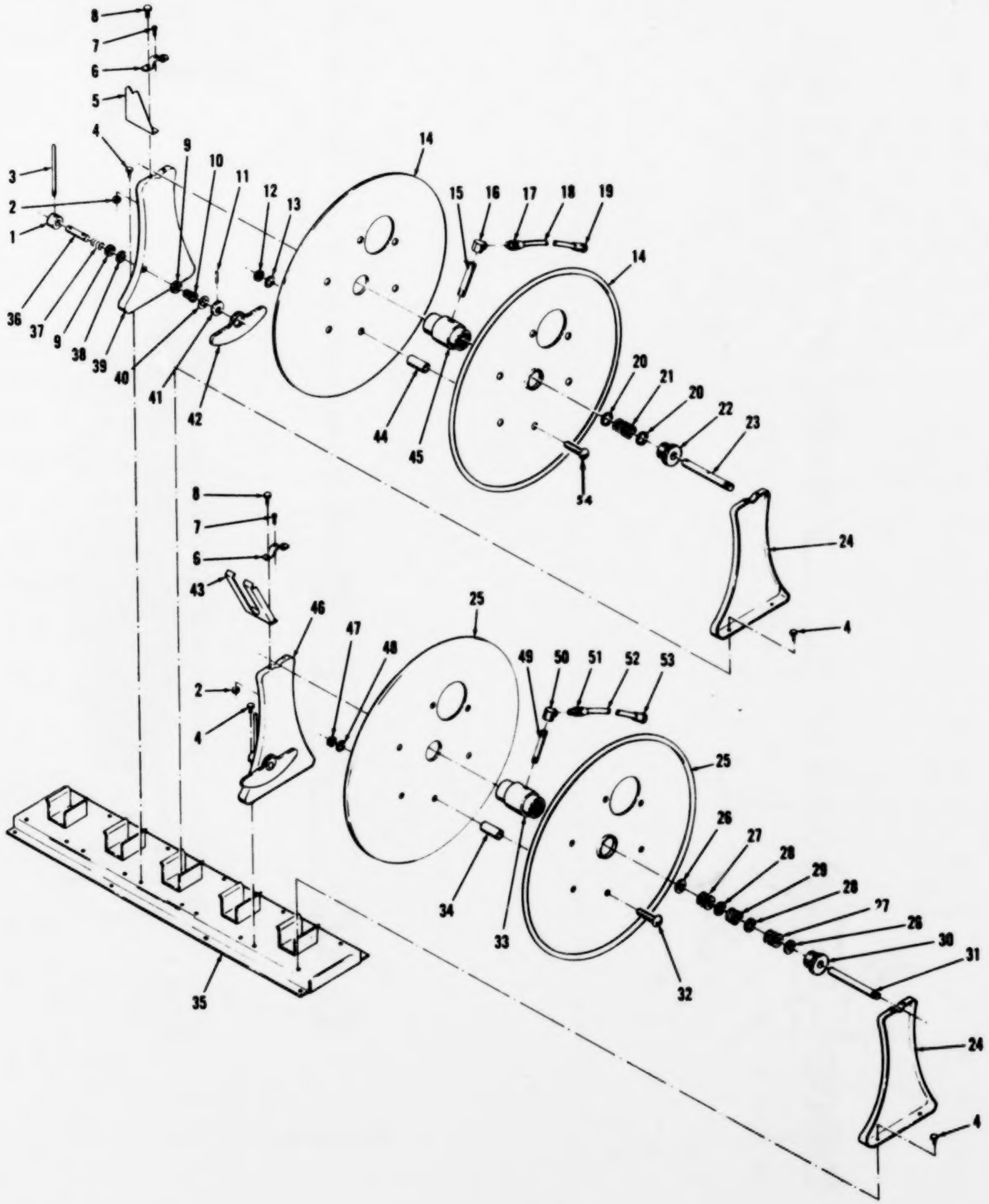
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Figure 58. Reel bank assembly.

INDEX TO FIGURE 58

1 Collar (5)
2 Hex nut (20)
3 Handle (5)
4 Cap screw (20)
5 Support bracket (2)
6 Shaft clamp (10)
7 Setscrew (10)
8 Cap screw (20)
9 Hex nut (10)
10 Brake shaft (5)
11 Roll pin (5)
12 Hex nut (6)
13 Lockwasher (6)
14 Reel (2)
15 Pipe nipple
16 Anchor union
17 Hose coupling (14)
18 Hose (14)
19 Hose coupling (14)
20 V-packing (2)
21 Spring
22 Packing nut
23 Swivel shaft
24 Pedestal (5)
25 Reel (8)
26 Packing gland (8)
27 V-packing (24)
28 Packing gland (8)
29 Spring (4)
30 Packing nut (4)
31 Swivel shaft (4)
32 Round head screw (24)
33 Reel hub (4)
34 Reel spacer (24)
35 Base
36 Shaft (5)
37 Spring (5)
38 Lockwasher (5)
39 Pedestal (5)
40 Flat washer (5)
41 Cam (5)
42 Brake shoe (5)
43 Hanger support (2)
44 Reel spacer (6)
45 Reel hub
46 Brake pedestal assy (5)
47 Hex nut (24)
48 Lockwasher (24)
49 Pipe nipple (4)
50 Anchor union (4)
51 Hose coupling (5)
52 Hose (5)
53 Hose coupling (5)
54 Round head screw (6)

c. Inspect reel stampings for bends, cracks, or other defects. Replace if defective.

d. Inspect all threaded surfaces for stripped or crossed threads. If beyond repair, replace.

e. Inspect springs for compression and tension. Replace if necessary.

227. Reel Bank Assembly, Reassembly and Installation

a. *Reassembly*. Reassemble both the lubricant hose reel assembly and air hose reel assembly the reverse of disassembly. Refer to figure 58 as an aid in reassembly.

b. *Installation*. Install the reel bank assembly as instructed in paragraph 193.

CHAPTER 10
TRAILER REPAIR INSTRUCTIONS

Section I. TRAILER WIRING HARNESS AND RECEPTACLE

228. Description

The trailer wiring harness consists of a receptacle connector and two wiring harnesses, which supply electrical current to the trailer lights when connected to the towing vehicle.

229. Removal

a. Remove 18 clamps (39, fig. 59) by unscrewing and removing screws (38) and nuts (37). Disconnect wiring harness from trailer lights.

b. Tag all leads from the wiring harnesses (1 and 33, fig. 59) to the receptacle assembly (31).

c. Remove receptacle (31, fig. 59) and two wiring harnesses (1 and 33).

230. Cleaning, Inspection, and Repair

a. Cleaning. Clean all parts with a cloth dampened in an approved cleaning solvent.

b. Inspection and Repair.

(1) Inspect both wiring harnesses for broken wires, corroded connections, frayed insulation and other damage. Replace defective harnesses.

(2) Inspect the receptacle for breaks, corroded contacts and other damage. Replace defective receptacle.

231. Installation

Install the trailer wiring harnesses and receptacle as indicated in figure 59.

Section II. SERVICE BRAKES

232. Description

The trailer service brakes are the scavenger type actuated by a diaphragm type air chamber. Each brake has two wheel cylinders secured to the backing plate. The wheel cylinders are actuated hydraulically to give an equal pressure to all brakeshoes.

233. Brakeshoes and Lining Removal and Disassembly

a. Removal. Remove the brake shoes as instructed in paragraph 150.

b. Disassembly. Remove rivets (36, fig. 30) and lining (35) from shoes (14).

INDEX TO FIGURE 59

1	Wiring harness, RH
2	Hex nut (2)
3	Hex head screw (2)
4	Splash guard (4)
5	Combination lamp assy (2)
6	Hex head screw (2)
7	Lockwasher (2)
8	Red lamp assy (7)
9	Pan head screw (14)
10	Hex nut (14)
11	Lockwasher (14)
12	Red reflector (4)
13	Hex nut (8)
14	Hex head screw (8)
15	Lockwasher (8)
16	Red blackout lamp assy (4)
17	Pan head screw (8)
18	Hex nut (8)
19	Amber blackout lamp assy (2)
20	Pan head screw (4)
21	Lockwasher (4)
22	Amber reflector (4)
23	Hex head screw (8)
24	Lockwasher (8)
25	Hex nut
26	Hex head screw
27	Spring clip
28	Grommet
29	Hex nut
30	Hex head screw
31	Receptacle assy
32	Jumper
33	Wiring harness, LH
34	Stop lamp assy
35	Hex head screw
36	Lockwasher
37	Hex nut (13)
38	Hex head screw (13)
39	Clamp (18)
40	Hex nut
41	Hex head screw
42	Spring clip
43	Hex nut (2)
44	Hex head screw (2)
45	Spring clip
46	Amber lamp assy (2)
47	Pan head screw (4)
48	Lockwasher (4)

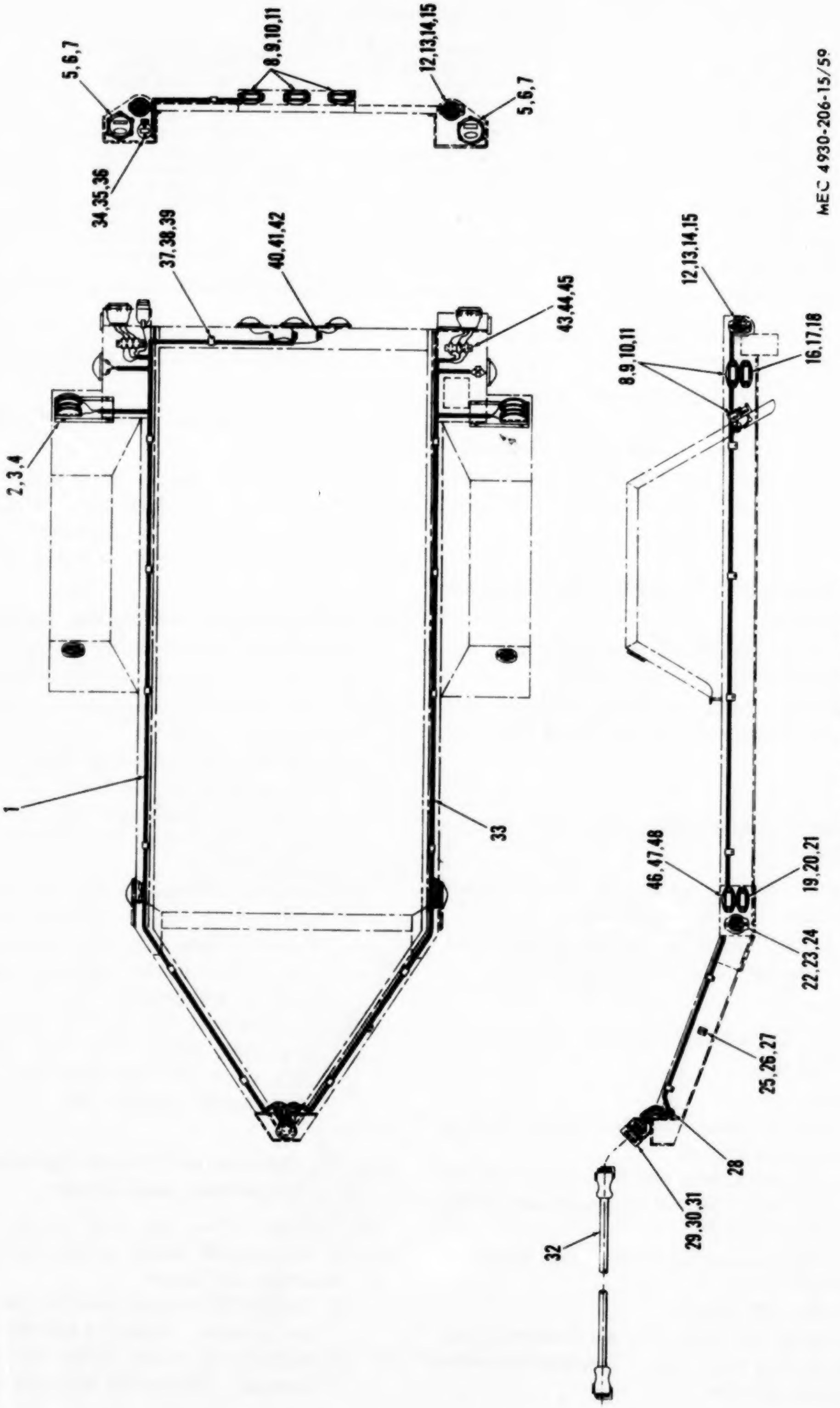
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Figure 59. Trailer wiring assembly.

INDEX TO FIGURE 60

1	Diaphragm
2	Diaphragm plate
3	Snap ring (3)
4	Cap screw (8)
5	Pipe plug (2)
6	Cap screw (3)
7	Valve cover
8	Diaphragm spring
9	Pressure plate
10	Valve bracket
11	Pipe plug
12	Bushing
13	O-ring packing
14	Valve body
15	O-ring packing (2)
16	Valve piston
17	O-ring packing
18	Spring
19	Valve assy
20	O-ring packing
21	Valve seat
22	Snap ring
23	Screen (2)
24	O-ring packing (2)
25	End cap (2)
26	Snap ring (4)
27	O-ring packing
28	End plug
29	Inlet valve
30	Spring
31	Vee block
32	O-ring packing
33	Guide post
34	Bleeder plug
35	Check valve
36	O-ring packing (2)
37	Nut and washer assy (8)
38	Piston washer
39	Valve piston

234. Brakeshoes and Lining Cleaning, Inspection and Repair

a. Cleaning. Clean brakeshoes and lining with a wire brush.

b. Inspection and Repair. Inspect the brake linings for excessive wear and evidence of grease or hydraulic fluid having penetrated the lining. Replace defective lining.

235. Brakeshoes and Lining Reassembly and Installation

a. Reassembly. Reassemble the lining (35, fig. 30) to brakeshoes (14) with rivets (36).

b. Installation. Refer to paragraph 150*b* and figure 30, for installation of the brakeshoes and lining.

236. Wheel Cylinder Removal and Disassembly

a. Removal. Refer to paragraph 151 and figure 30 for removal of the wheel cylinders.

b. Disassembly. Refer to paragraph 151*b* and figure 31 for disassembly of the wheel cylinder.

237. Wheel Cylinder Cleaning, Inspection, and Repair

a. Cleaning.

(1) Clean all parts with clean brake fluid or denatured alcohol.

(2) Clean corrosion or rust from inside cylinder with a narrow strip of crocus cloth dampened with brake fluid.

Note. Do not use a mineral-base solvent for cleaning.

b. Inspection and Repair.

(1) Inspect the inside of the cylinder for pits, scratches and rust. Replace defective wheel cylinder.

(2) Inspect all other parts for wear and damage. Replace all defective parts.

238. Wheel Cylinder Reassembly and Installation

a. Reassembly. Refer to paragraph 151*d* and figure 31 for reassembly of the wheel cylinder.

b. Installation. Refer to paragraph 151*e* and figure 30 for installation of the wheel cylinder.

239. Air Cylinder and Master Cylinder Removal and Disassembly

a. Removal. Remove the air cylinder and master cylinder as indicated in paragraphs 152 and 153.

b. Disassembly.

(1) Unscrew and remove 16 nuts (1, fig. 33), lockwashers (2) and bolts (10). Remove cover (9), diaphragm (8), retainer (7), spring (6), O-ring (5) and rod (4) from inside body (3).

(2) Unscrew and remove filler cap (27, fig. 33) and gasket (26). Remove plug (25). Unscrew nuts (24) and remove washers (23). Pull master cylinder away from body (3) and bracket (13).

(3) Remove boot (14, fig. 33), lock wire (15), stop (16), piston (17), cup (18), spring (19), valve (20) and valve seat (21) from inside master cylinder (22).

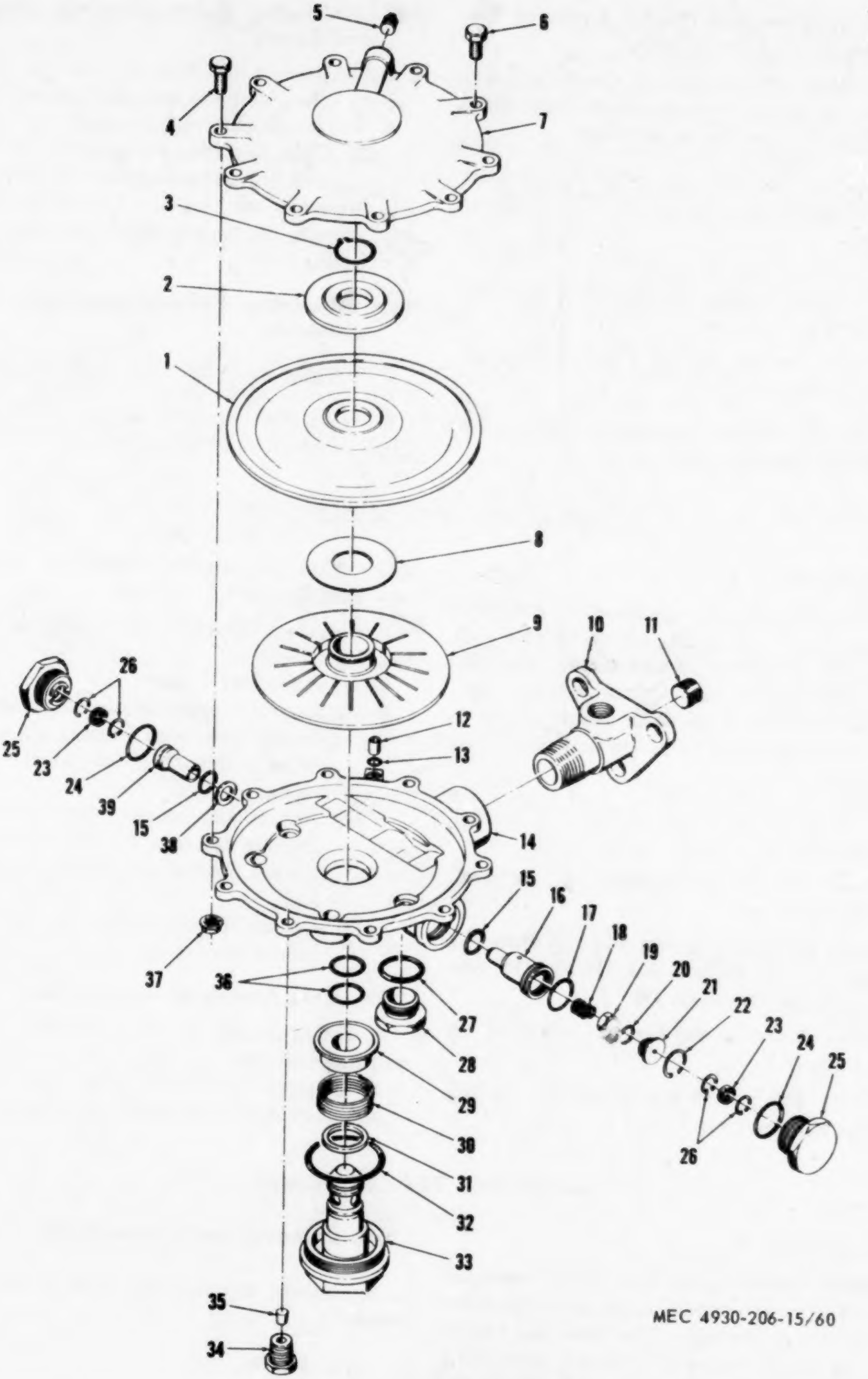
240. Air Cylinder and Master Cylinder Cleaning, Inspection, and Repair

a. Cleaning. Clean all parts of the hydraulic cylinder in a manner similar to the wheel cylinder.

b. Inspection and Repair.

(1) Inspect the cylinder bore for pits, scratches and grooves. Replace a defective cylinder.

(2) Inspect all other parts for wear and damage. Replace all defective parts.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MEC 4930-206-15/60

Figure 60. Air relay valve assembly.

241. Air Cylinder and Master Cylinder Reassembly and Installation

a. Reassembly. Reassembly of the air cylinder and master cylinder is the opposite of disassembly. Refer to figure 33 as an aid in assembly.

b. Installation. Install the air cylinder and master cylinder as instructed in paragraphs 152 and 153.

242. Air Relay Valve Removal and Disassembly

a. Removal. Remove the air relay valve as instructed in paragraph 155.

b. Disassembly. Disassemble the air relay valve as indicated in figure 60.

243. Air Relay Valve Cleaning, Inspection and Repair

a. Cleaning.

(1) Clean all parts with an improved cleaning solvent and dry thoroughly.

(2) Clean diaphragms with a clean cloth dampened in an approved cleaning solvent.

b. Inspection and Repair. Inspect all parts for wear, breaks, cracks, and other damage. Replace all defective parts.

244. Air Relay Valve Reassembly and Installation

a. Reassembly. Reassembly of the air relay valve is the opposite of disassembly. Refer to figure 60.

b. Installation. Refer to paragraph 155 for installation of the air relay valve.

Section III. AXLE ASSEMBLY

245. Description

The trailer axle assembly consists of an axle tube and a tie beam connecting the axle tube with a stub axle on which the wheels are mounted. The axle tube is mounted to the trailer frame with two bearings, one on each side of the trailer frame. A shock absorber mounting link is welded to each side end of the axle tube.

246. Removal

a. Remove the shock absorbers as instructed in paragraph 158.

b. Remove springs by unscrewing and removing 16 hex nuts (38, fig. 35) and four U-bolts (14) and hex nuts (7) and lockwashers (8).

c. Remove brake assemblies as instructed in paragraph 150.

d. Unscrew and remove cap screws (40, fig. 35) and remove axle assembly.

247. Axle Assembly Cleaning Inspection and Repair

a. Cleaning. Clean all parts with an improved cleaning solvent.

b. Inspection and Repair.

(1) Inspect the axle for bends, broken welds, cracks, and worn bearing journals. Replace a defective axle which is beyond repair.

(2) Inspect the bearings for excessive wear. Replace bearings if the clearance between the axle journal and bearing exceeds 0.020-inch.

(3) Replace defective mounting hard wear and lubrication fittings.

248. Axle Assembly Installation

a. Install the axle assembly in reverse instructions to paragraph 246.

b. Install the brake assemblies.

c. Install shock absorbers and springs.

Section IV. TRAILER FRAME

249. Description

The trailer frame is of all steel-welded construction consisting of two parallel frame rails with cross-members between the rails. The frame has a landing gear bracket, spring hanger bracket, hand lifting bars, lashing rings, and two upper halves of the bearing housing welded to it.

250. Removal and Disassembly

a. Remove the following components from the frame.

(1) Lights.

(2) Brake air system tubing and connectors.

(3) Brake hydraulic system tubing and connectors
(4) Air brake chamber and brake cylinder.
(5) Air brake valve.
(6) Air pressure tank.
(7) Landing gear.
(8) Shock absorbers.
(9) Springs.

b. Remove the wiring harness and receptacle (paragraph 229).

c. Remove the axle assembly (para 246).

251. Cleaning, Inspection, and Repair

a. Cleaning. Clean the frame with an approved cleaning solvent and remove all rust and corrosion.

b. Inspection and Repair.

(1) Inspect the frame for misalignment, breaks, broken welds, cracks, and other damage.
(2) Straighten and weld all loose and twisted frame members. Align frame if necessary. Replace frame damaged beyond repair.
(3) Repaint frame as necessary.

252. Reassembly and Installation

a. Install the axle assembly (para 248).

b. Install the wiring harness and receptacle (para 231).

c. Install the following items:

(1) Springs.
(2) Shock absorbers.
(3) Landing gear.
(4) Air pressure tank.
(5) Air brake valve.
(6) Air brake chamber and air cylinder.
(7) Brake hydraulic system tubing and connectors.
(8) Brake air system tubing and connectors.
(9) Lights.

APPENDIX I
REFERENCES

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1. Dictionaries of Terms and Abbreviations

AR 320-5	Dictionary of United States Army Terms.
AR 320-50	Authorized Abbreviations and Brevity Codes.

2. Fire Protection

TM 5-687	Repair and Utilities: Fire Protection Equipment and Appliances: Inspections, Operations, and Preventive Maintenance.
TM 9-1799	Ordnance Maintenance, Fire Extinguisher.

3. Lubrication

LO 5-4930-206-15	Lubricating and Servicing Unit: Trailer Mounted; 16 CFM Compressor; Gasoline Driven (Gray Company, Inc. Model 251-437).
LO 5-2805-203-14	Engine, Gasoline; 6HP Military Standard Model 4A032-1.

4. Preventive Maintenance

AF 750-5	Organization, Policies and Responsibilities for Maintenance Operation.
TB ENG 347	Winterization Techniques for Engineer Equipment.
TM 9-207	Operation and Maintenance of Army Material in Extreme Cold (0° to —65° F.).
TM 9-6140-200-15	Operation and Organizational, Field and Depot Maintenance: Storage Batteries, Lead-Acid Type.
TM 38-750	Army Equipment Record Procedures.
TM 5-2805-203-14	Operator, Organizational, and Field Maintenance Manual, Engine, Gasoline: 6 HP, Military Standard Model 4A032-1.

5. Painting

TM 9-213	Painting Instructions for Field Use.

6. Publication Indexes

DA Pam 108-1	Index of Army Motion Pictures, Film Strips, Slides, and Phono-Recordings.
DA Pam 310-1	Index of Administrative Publications.
DA Pam 310-2	Index of Blank Forms.
DA Pam 310-3	Index of Doctrinal, Training and Organizational Publications.
DA Pam 310-4	Index of Technical Manuals, Technical Bulletins, Supply Manuals (type 4, 6, 7, 8, and 9), Supply Bulletins, Lubrication Orders, and Modification Work Orders.
DA Pam 310-5	Index of Graphic Training Aids and Devices.
DA Pam 310-25	Index of Supply Manuals—Engineer Type Items.

7. Radio Interference Suppression

TM 11-483	Radio Interference Suppression.

8. Shipment and Limited Storage

AR 743–505	Limited Storage of Corps of Engineers Mechanical Equipment.
TM 9–200	General Packaging Instructions for Ordnance General Supplies.
TM 38–230	Preservation, Packaging, and Packing of Military Supplies and Equipment.

9. Supply Publications

C–9100IL	Petroleum, Petroleum-Base Products and Related Material.
TM 5–4930–206–25P	Organizational, Direct and General Support, and Depot Maintenance Repair Parts and Special Tools List: Lubricating and Servicing Unit: Trailer Mounted; 16 CFM Compressor; Gasoline Driven (Gray Company, Inc. Model 251–437).

10. Training Aids

FM 5–25	Explosive and Demolition.
FM–21–5	Military Training.
FM–21–6	Techniques of Military Instruction.
FM 21–30	Military Symbols.

APPENDIX II
MAINTENANCE ALLOCATION CHART

Section I. INTRODUCTION

1. General

This appendix contains the explanations of all the maintenance and repair functions authorized the various maintenance levels.

Section II contains the maintenance allocation chart (MAC) designating overall responsibility for the performance of maintenance functions.

Section III contains supplemental instructions, explanatory notes and/or illustrations required for a particular maintenance function. The implementation of maintenance tasks upon the end item or component will be consistent with the assigned maintenance operations.

2. Maintenance, Section II

Maintenance is any action taken to keep material in a serviceable condition or to restore it to serviceability when it is unserviceable. Maintenance of material includes the following:

a. Service. Operations required periodically to keep the item in proper operating condition, i.e., to clean, preserve, drain, paint, and replenish fuel, lubricants, hydraulic, and de-icing fluids or compressed air supplies.

b. Adjust. Regulate periodically to prevent malfunction. Adjustments will be made to commensurate with adjustment procedures and associated equipment specifications.

c. Aline. Adjust two or more components of an electrical or mechanical system so that their functions are properly synchronized or adjusted.

d. Calibrate. Determine, check, or rectify the graduation of an instrument, weapon, or weapons system or components of a weapons system.

e. Inspect. Verify serviceability and detect incipient electrical or mechanical failure by close visual examination.

f. Test. Verify serviceability and detect incipient electrical or mechanical failure by measuring the mechanical or electrical characteristics of the item and comparing those characteristics with authorized standards. Tests will be made to commensurate with test procedures and with calibrated tools and/or test equipment referenced on the MAC.

g. Replace. Substitute serviceable components, assemblies and subassemblies for unserviceable counter parts or remove and install the same item when required for the performance of other maintenance operations.

h. Repair. Restore to a serviceable condition by replacing unserviceable parts or by any other action required using available tools, equipment and skills to include welding, grinding, riveting, straightening, adjusting and facing.

i. Overhaul. Restore an end item to completely serviceable condition as prescribed by serviceability standards developed and published by heads of technical services. This is accomplished through employment of the technique of "Inspection and repair only as necessary" (IROAN). Maximum use of diagnostic and test equipment is combined with minimum disassembly during overhaul. "Overhaul" may be assigned to any level of maintenance except organizational, provided the time, tools, equipment, repair parts authorization, and technical skills are available at that level. Normally, overhaul as applied to end items, is limited to depot maintenance level.

j. Rebuild. Restore to a condition comparable to new by disassembling to determine the condition of each component part and reassemble using serviceable, rebuilt, or new assemblies, subassemblies, and parts.

3. Explanation of Columns, Section II

a. Functional Group Number. The functional group is a numerical group set up on a functional basis. The appliable functional grouping indexes (obtained from TB 750-93-1 Functional Grouping Codes) are listed on the MAC in the appropriate numerical sequence. These indexes are normally set up in accordance with their function and proximity to each other.

b. Component Assembly Nomenclature. This column contains the functional grouping index heading, subgroups heading, and a brief description of the part starting with the noun name.

c. Essentiality. The essentiality column reflects whether or not an assembly is combat essential to the tactical use of the end item. The letter E in this column indicates the items are combat essential.

d. Maintenance Operations and Maintenance Levels. This column contains the various maintenance operations A through J, service, adjust, etc.

A letter indicating the maintenance level placed in the appropriate column in line with an indicated maintenance operation authorizes that level to perform the function. The letter indicates the lowest level of maintenance responsible for performing the function. But does not necessarily indicate repair parts stockage at that level. Higher levels of maintenance are authorized to perform the indicated functions of lower levels. This column contains the various maintenance levels by letter designation.

O/C	Operator or crew
O	Organizational
DS	Direct Support
GS	General Support
D	Depot

4. Remarks, Section III

This section cross references the remark column to a specific maintenance function on the MAC section II.

a. Reference Code. The reference code consists of two letters separated by a dash, the first letter references column L. The second letter references a maintenance operation column A through J on the MAC section II.

b. Remarks. This section is provided for referencing the maintenance functions and the remarks that may be associated with each maintenance operation and other information pertinent to the operation being performed as indicated in column L on the MAC section II.

Section II. MAINTENANCE ALLOCATION CHART

Functional group No.	For: Lubricating and servicing unit: trailer mounted: 15 cmf compressor; gasoline driven (Grey model 251-437) FSN 4930-892-5067 Component assembly nomenclature	Essentiality	Maintenance operations A Service	B Adjust	C Aline	D Calibrate	E Inspect	F Test	G Replace	H Repair	Maintenance levels I Overhaul	J Rebuild	Note ref K T&TE rqmt	L Remarks
01	ENGINE													
0100	Engine Assembly													
	Engine assembly, gasoline		O/C				O/C	O	O		GS			A
0103	Flywheel Assembly													
	Cover, flywheel								DS					
0106	Engine Lubrication System													
	Drain assembly, oil								O					
02	CLUTCH													
0200	Clutch Assembly													
	Clutch assembly		O/C				O		DS					
03	FUEL SYSTEM													
0306	Tanks, Lines, Fittings													
	Cap, fuel tank								O					
	Lines and fittings								O	O				
	Strainer		O/C						O					
	Tank assembly, fuel		O/C						O	O				
0312	Accelerator, Throttle or Choke Controls													
	Choke control								O					
	Throttle control								O					
04	EXHAUST SYSTEM													
0401	Mufflers and Pipes													
	Deflector and pipe								O	O				
06	ELECTRICAL SYSTEM													
0601	Generator													
	Brush, generator								DS					
	Belt, drive		O/C						O					
	Generator assembly							O	O	DS				
	Relay, cutout								DS					
0602	Generator Regulator													
	Control, voltage								O					
0603	Starting Motor													
	Brushes, starter								DS					
	Starter assembly							O	O	DS				
	Solenoid switch								O					
0606	Engine Safety Controls													
	Switch, oil and temperature			O					O					

0607	Instrument or Engine Control Panel													
	Gage, temperature								O					
	Indicator, liquid quantity								O					
	Indicator, oil pressure								O					
	Meter, battery generator								O					
	Panel, control								O					
	Switches								O					
	Wiring								O	O				
0610	Sending Units													
	Transmitters								O					
0612	Battery, Storage													
	Battery, storage		O/C					O	O/C					
	Cable, battery								O					
	Drawer, battery								O					
	TRAILER MAINTENANCE													B
15	FRAME													
1501	Frame Assembly													
	Cover								O	O				
	Frame and tank									O				
18	BODY, CAB, HOOD AND HULL													
1808	Stowage Racks, Boxes, Hose Reels													
	Drawer, tool								O					
	Reel, hose								O	O				
1812	Special Purpose Bodies													
	Inclosure								O	DS				
	Lifting eyes and handles								O					
	Stops, door								O					
22	BODY CHASSIS OR HULL AND ACCESSORY ITEMS													
2202	Accessory Items													
	Cable assembly								O					
	Hose assembly								O					
	Light, reel assembly								O	O				
2207	Winterization Equipment													
	Dispenser, alcohol		O/C						O	O				
2210	Data Plates													
	Plates, data								DS					
	Plates, instruction								O					
47	GAGES													
4702	Gages, Mountings, Lines and Fittings													
	Gage, air pressure								O					
	Lines and fittings								O					
4705	Flow Meters and Regulators													
	Control, air								O	O				
	Regulator, pressure								O	DS				

Functional group No.	For: Lubricating and servicing unit: trailer mounted: 15 cmf compressor; gasoline driven (Grey model 251-437) FSN 4930-892-5067	Essentiality	Maintenance operations									Maintenance levels	Note ref	
			A	B	C	D	E	F	G	H	I	J	K	L
	Component assembly nomenclature		Service	Adjust	Aline	Calibrate	Inspect	Test	Replace	Repair	Overhaul	Rebuild	T&TE rqmt	Remarks
50	PNEUMATIC EQUIPMENT													
5000	Air Compressor Assembly													
	Air compressor assembly		O/C				O/C		O	DS	GS			
5001	Crankcase, Block, Cylinder Head													
	Crankcase assembly								DS	DS				
	Cylinder								DS					
	Plate, access cover								O					
5002	Crankshaft													
	Bearings, sleeve								DS					
	Crankshaft assembly								DS			D		C
	Seal, oil								DS					
5004	Pistons, Connecting Rods													
	Piston assembly								DS					
	Rod assembly								DS					
5005	Valves													
	Disc, valve								O					
	Housing, valve								O					
	Valve springs								O					
5006	Lubrication System													
	Tube, drain								O					
5007	Compressor Drive													
	Belts, "V"			O/C					O					
	Flywheel and guard								O					
5008	Air Intakes													
	Cleaner, air		O/C						O					
	Manifold, intake								O					
5009	Unloader System Components													
	Body cover, governor								DS					
	Lines								DS					
	Manifold, aftercooler								DS					
	Plunger, spring, ball								DS					
	Spring-sleeve, governor								DS					
	Spindle, governor								DS					
	Valve, safety relief								DS	DS				
	Valve, check								DS					
	Weight, control								DS	DS				
5010	Compressor Cooling and Heating													
	Manifold, intake and exhaust								O					

	Tube, intercooler-aftercooler								O	O				
5012	Throttling Devices													
	Control, throttle								O					
5014	Air Receiver													
	Cock, drain								O					
	Tank, air		O						DS					
5015	Air Discharge System													
	Hose								O					
	Valve, globe								O					
72	DISPENSING AND SERVICING EQUIPMENT COMPONENTS													
7201	Lubricating Equipment													
	Gun, power								O	DS				
	Gun, oil								O	O				
	Gun, lever								O	O				
	Gun, suction								O					
	Gun, oil spray								O	O				
	Reservoir, oiler								O					
7202	Pumps and Meters													
	Pumps		O/C						O	DS				
	Meters								O	O				
7203	Valves, Fittings, Lines													
	Regulator, air								O	O				
	Valve, control								O	O				
76	FIRE FIGHTING EQUIPMENT													
7603	Fire Extinguishers													
	Extinguisher, fire									O/C				

FOR: ______________________________ DATE ______________

______________________________ PAGE ________ OF ______

REFERENCE CODE	REMARKS
A–A E F G I	For engine assembly, military standard model 4A032–1 FSN 2804–776–0488. Reference TM 5–2805–203–14, 24P, and TM 5–2805–203–50, 50P.
B–L	For maintenance allocation chart relative to the trailer refer to TM 5–2330–216–15.
C–J	Rebuild of crankshaft includes metalizing, aligning, and regrinding.

APPENDIX III

BASIC ISSUE ITEMS LIST AND MAINTENANCE AND OPERATING SUPPLIES

Section I. INTRODUCTION

1. General

Section II lists the accessories, tools, and publications required for maintenance and operation by the operator, initially issued with, or authorized for the maintenance and operating supplies required for initial operation.

2. Explanation of Columns Contained in Section II

a. Source Codes. The information provided in each column is as follows:

(1) *Materiel.* This column lists the basic materiel code number of the supply service assigned responsibility for the part. Blank spaces denote supply responsibility of the preparing agency. General Engineer supply parts are identified by the letters GE in parentheses, following the nomenclature in the description column. Other basic materiel code numbers are:

3—Chemical Materiel
9—Ordnance Materiel
10—Quartermaster Materiel

(2) *Source.* The selection status and source of supply for each part are indicated by one of the following code symbols:

(*a*) P—applied to high-mortality repair parts which are stocked in or supplied from the supply service depot system, and authorized for use at indicated maintenance levels.

(*b*) P1—applied to repair parts which are low-mortality parts, stocked in or supplied from supply service depots, and authorized for installation at indicated maintenance level.

(*c*) M—applied to repair parts which are not procured or stocked but are to be manufactured at indicated maintenance levels.

(*d*) X2—applied to repair parts which are not stocked. The indicated maintenance echelon requiring such repair parts will attempt to obtain them through cannibalization; if not obtainable through cannibalization, such repair parts will be requisitioned with supporting justification through normal supply channels.

(3) *Maintenance.* The lowest maintenance level authorized to use, stock, install, or manufacture the part is indicated by the following code symbol:

O—Organizational Maintenance

(4) *Recoverability.* Repair parts and/or tool and equipment items that are recoverable are indicated by one of the following code symbols:

(*a*) R—applied to repair parts and assemblies which are economically repairable at direct and general support maintenance activities and normally are furnished by supply on an exchange basis.

(*b*) T—applied to high-dollar value recoverable repair parts which are subject to special handling and are issued on an exchange basis. Such repair parts normally are repaired or overhauled at depot maintenance facilities.

(*c*) U—applied to repair parts specifically selected for salvage by reclamation units because of precious metal content, critical materials, high-dollar value reusable casings, castings, and the like.

Note. When no code is shown in the recoverability column the part is considered expendable.

b. Federal Stock Number. When a Federal stock number is available for a part, it will be shown in this column, and will be used for requisitioning purposes.

c. Description.

(1) The Item name and a brief description of the part are shown.

(2) A five-digit Federal supply code for manufacturers and/or other supply services is shown in parentheses followed by the manufacturer's part number. This number shall be used for requisitioning purposes when no Federal stock number is indicated in the Federal stock number column. *Example*: (08645) 86543

(3) The letters GE, shown in parentheses immediately following the description, indicates General Engineer supply responsibility for the part.

d. Unit of Issue. If no abbreviation is shown in this column, the unit of issue is "each".

e. Quantity Authorized. This column lists the quantities of repair parts, accessories, tools, or publications authorized for issue to the equipment operator or crew as required.

f. Quantity Issued with Equipment. This column lists the quantities of repair parts, accessories, tools, or publications that are initially issued with each item of equipment. Those indicated by an asterisk are to be requisitioned through normal supply channels as required.

g. Illustrations. This column is subdivided into two columns which provide the following information:

(1) *Figure number.* Provides the identifying number of the illustration.

(2) *Item number.* Provides the referenced number for the parts shown in the illustration.

3. Federal Supply Code for Manufacturers

25980	Gray Co. Inc.
30327	Imperial Eastman Corp.
84572	Foster Mfg. Co.

4. Explanation of Columns Contained in Section III

a. Item. This column contains numerical sequenced item numbers, assigned to each component application, to facilitate reference.

b. Component Application. This column identifies the component application of each maintenance or operating supply item.

c. Source of Supply. This column lists the basic material code number of the supply service assigned responsibility for the item. Blank spaces denote supply responsibility of the preparing agency. Other basic materiel code numbers are:

9—Ordnance Materiel
10—Quartermaster Materiel

d. Federal Stock Number. The Federal stock number will be shown in this column and will be used for requisitioning purposes.

e. Description. The item and a brief description are shown.

f. Quantity Required for Initial Operation. This column lists the quantity of each maintenance or operating supply item required for initial operation of the equipment.

g. Quantity Required for 8 Hours Operation. Quantities listed represent the estimated requirements for an average eight hours of operation.

h. Notes. This column contains informative notes keyed to data appearing in the preceding column.

Section II. ACCESSORIES, TOOLS, AND PUBLICATIONS

Basic Issue Items List

Source codes				Federal stock No.	Description	Unit of issue	Quantity authorized	Quantity issued with equipment	Illustration	
Materiel	Source	Maintenance	Recoverability						Fig.	Item
					GROUP 31 BASIC ISSUE ITEMS, MANUFACTURER INSTALLED					
					3100—BASIC ISSUE ITEMS, MANUFACTURER OR DEPOT INSTALLED					
	P1	O	......	4930-020-5549	ADAPTER, FLEXIBLE (Repair parts manual group 7203).	......	1	1	11	22
	P1	O	......	4930-979-5574	ADAPTER ASSEMBLY (Repair parts manual group 7203).	......	1	1	11	23

Source codes				Federal stock No.	Description	Unit of issue	Quantity authorized	Quantity issued with equipment	Illustration	
Materiel	Source	Maintenance	Recoverability						Fig.	Item
					3100—BASIC ISSUE ITEMS, MANUFACTURER OR DEPOT INSTALLED—Continued					
	P1	O	------	4930-020-5548	ADAPTER, FLEXIBLE (Repair parts manual group 7203).	------	1	1	11	24
9	P	O	------	6140-057-2554	BATTERY: storage, 12V, 6 cell (Repair parts manual group 0612).	------	2	2		
10	P	O	------	7520-559-9618	CASE: maintenance and operational manuals, cotton duct, water repellent, mildew resistant, MIL-B-11743B.	------	1	1		
	P1	O	------	----------------	COUPLING, HOSE (30327) Spec—904BXO4 (Repair parts manual group 7203).	------	1	1	11	1
	P1	O	------	----------------	COUPLING, HOSE (30327) 00904-104 (Repair parts manual group 7203).	------	1	1	11	2
	P1	O	------	----------------	COUPLING, HOSE (30327) 4506-6F (Repair parts manual group 7203).	------	1	1	11	3
	P1	O	------	4730-986-0175	COUPLING, HOSE (Repair parts manual group 7203).	------	1	1	11	4
	P1	O	------	4930-630-9805	COUPLER, AIR (Repair parts manual group 7203).	------	2	2	11	11
	P1	O	------	4910-204-2644	CHUCK AND GAGE, AIR (Repair parts manual group 4702).	------	1	1	11	20
	X2	O	------	----------------	DRUM, TOP (25980) 161-187 (Repair parts manual group 7202).	------	1	1		
12	------	------	------	----------------	DEPARTMENT OF THE ARMY TECHNICAL MANUAL TM 5-2805-203-14.	------	2	2		
12	------	------	------	----------------	DEPARTMENT OF THE ARMY TECHNICAL MANUAL TM 5-2805-203-14P.	------	2	2		
12	------	------	------	----------------	DEPARTMENT OF THE ARMY TECHNICAL MANUAL TM 5-2805-203-50.	------	2	2		
12	------	------	------	----------------	DEPARTMENT OF THE ARMY TECHNICAL MANUAL TM 5-2805-203-50P.	------	2	2		
12	------	------	------	----------------	DEPARTMENT OF THE ARMY TECHNICAL MANUAL TM 5-2330-216-15.	------	2	2		
12	------	------	------	----------------	DEPARTMENT OF THE ARMY OPERATOR, ORGANIZATIONAL, DIRECT AND GENERAL SUPPORT AND DEPOT MAINTENANCE MANUAL TM 5-4930-206-15.	------	2	2		
12	------	------	------	----------------	DEPARTMENT OF THE ARMY ORGANIZATIONAL, DIRECT AND GENERAL SUPPORT AND DEPOT MAINTENANCE REPAIR PARTS MANUAL TM 5-4930-206-25P.	------	2	2		
12	------	------	------	----------------	DEPARTMENT OF THE ARMY LUBRICATION ORDER LO 5-2805-203-14.	------	1	1		
	P1	O	------	4210-223-7910	EXTINGUISHER, FIRE: co 2 (Repair parts manual group 7603).	------	1	1	8	9
	P	O	------	4730-188-6314	FITTING, LUBRICATION (Repair parts manual group 7203).	------	6	6	11	5
	P	O	------	4730-223-6411	FITTING, LUBRICATION (Repair parts manual group 7203).	------	6	6	11	11
	P	O	------	4730-243-1484	FITTING, LUBRICATION (Repair parts manual group 8203).	------	6	6	11	12

Basic Issue Items List—Continued

Source codes				Federal stock No.	Description	Unit of issue	Quantity authorized	Quantity issued with equipment	Illustration	
Materiel	Source	Maintenance	Recoverability						Fig.	Item
					3100—BASIC ISSUE ITEMS, MANUFACTURER OR DEPOT INSTALLED—Continued					
	P	O		4730-556-8148	FITTING, LUBRICATION (Repair parts manual group 7203).		6	6	11	13
	P	O		4730-223-6422	FITTING, LUBRICATION (Repair parts manual group 7203).		6	6	11	14
	P	O		4730-279-0359	FITTING, LUBRICATION (Repair parts manual group 7203).		6	6	11	15
	P	O		4730-288-7820	FITTING, LUBRICATION (Repair parts manual group 7203).		6	6	11	16
	X2	O			GUN, SUCTION, HAND (25980) 206-098 (Repair parts manual group 7201).		1	1	12	2
	X2	O			GUN ASSEMBLY: lever operated (25980) 226-207 (Repair parts manual group 7201).		1	1	12	1
	P1	O		4930-977-8901	GUN, SPRAY, OIL: air operated (Repair parts manual group 7201).		1	1	12	6
	P1	O		4930-020-5547	HOSE ASSEMBLY: transfer (Repair parts manual group 4702).		1	1	10	1
	M				HOSE ASSEMBLY, OIL (25980) 206-007 MANUFACTURE FROM:		1	1		
	P	O		4720-639-9895	HOSE, RUBBER (10 ft required)	FT				
		O		4730-986-0175	COUPLING ASSEMBLY		1	*		
		O		4730-986-0176	COUPLING ASSEMBLY (Repair parts manual group 4702).		1	*		
	M				HOSE ASSEMBLY, AIR (25980) 206-12		3	3		
	P	O		4720-273-9514	HOSE RUBBER (12 in. required for each hose assembly).	FT				
	X2				COUPLING ASSEMBLY (25980) 206-085.		3	*		
	X2				COUPLING ASSEMBLY (25980) 206-086 (Repair parts manual group 4702).		3	*		
	X2	O			LUBRICATOR ASSEMBLY (25980) 206-141 (Repair parts manual group 7201).		1	1	13	
	P1	O		4930-572-2280	NOZZLE, FLEXIBLE (Repair parts manual group 7201).		1	1	12	7
	P1	O		4930-654-3557	NIPPLE (Repair parts manual group 7203)		2	2	11	26
	P1	O			OILER, PISTOL (2598) 150-150 (Repair parts manual group 7201).		1	1	11	21
				4730-018-9566	PLUG, PIPE (Repair parts manual group 7203).		2	2	11	8
	X2	O			PUMP ASSEMBLY: transfer (25980) 206-480 (Repair parts manual group 7201).		1	1	10	6
3	P	O		6810-264-9063	SULPHURIC ACID: electrolyte (Repair parts manual group 0612).	GAL	4	4		
	P1	O		4930-212-5854	SWIVEL ASSEMBLY (Repair parts manual group 7203).		1	1	11	6
	P1	O		4930-587-0341	SWIVEL ASSEMBLY (Repair parts manual group 7203).		1	1	11	7
	P1	O		4930-785-5081	VALVE ASSEMBLY, BLOWER (Repair parts manual group 7203).		1	1	11	19

Basic Issue Items List—Continued

Source codes				Federal stock No.	Description	Unit of issue	Quantity authorized	Quantity issued with equipment	Illustration	
Material	Source	Maintenance	Recoverability						Fig.	Item
					GROUP 32 BASIC ISSUE ITEMS, TROOP INSTALLED					
					3200—BASIC ISSUE ITEMS, TROOP INSTALLED OR AUTHORIZED					
	P	O	......	5110-228-3188	BLADE, HAND HACKSAW: 12 in. lg	......	1	*	12	4
	P	O	......	5110-223-4971	FRAME, HAND, HACKSAW: adjustable length, open pistol grip handle.	......	1	*	12	3
				5120-223-7307	PLIERS, SLIP-JOINT: stght nose, combination w/cutter 8 in. lg.	......	1	*		
	P	O	......	5120-234-8910	SCREWDRIVER, FLAT TIP: plastic handle ⅜ in. flared tip, 6 in. lg blade.	......	1	*		
	P	O	......	....	TOOL, EASY-OUT (2[illegible]80) 101-604	......	1	*	11	10
	P	O	......	5120-240-5328	WRENCH, OPEN END ADJUSTABLE: sgle head, 0 to 947 in. jaw opening 8 in. lg.	......	1	*		

Section III. 90-MAINTENANCE AND OPERATING SUPPLIES

Maintenance and Operating Supplies

Item	Component application	Source of supply	Federal stock No.	Description	Quantity required for initial operation	Quantity required for 8 hours operation	Notes
1	0101 CRANKCASE (1)	......	....	OIL, LUBRICATING: 55 gal drums as follows:			(1) Includes quantity of oil to fill engine oil system as follows: 1⅝ qt Crankcase ½ qt Oil filter (2) See C9100-IL for additional data and requisitioning procedure. (3) See current LO for grade application and replenishment intervals. (4) Use oil as prescribed in item 1. (5) Tank capacity. (6) Average fuel consumption is ½ gal per hour of continuous operation.
		10	9150-265-9436	Grade 9250 or OE-30	2⅛ qt	(3)	
		10	9150-265-9429	Grade 9110 or OE-10	2⅛ qt	(3)	
		10	9150-242-7604	OES	2⅛ qt	(3)	
2	0306 FUEL TANK	......	....	FUEL GASOLINE: bulk as follows:			
		10	9130-160-1818	Automotive, Combat 91A	10 gal(5)	4 gal(6)	
				HYDRAULIC FLUID: 1 qt can as follows:			
3	1204 HYDRAULIC BRAKE SYSTEM	10	9150-190-0932	HB	5/16 qt	(3)	
4	2207 WINTERIZATION: Alcohol dispenser	......	....	ALCOHOL DENATURED:			
		9	6810-264-6583	1 qt bottle	¼ qt	(5)	
5	5001 CRANKCASE, COMPRESSOR	......	....	OIL, LUBRICATING (4)			
				OE-30	2½ qt	(3)	
				OE-10	2½ qt	(3)	
				OES	2½ qt	(3)	
6	OIL CAN POINTS	......	....	OIL LUBRICATING (4)	....	(3)	
7	GREASE FITTINGS	......	9150-190-0905	GREASE, AUTOMOTIVE AND ARTILLERY, GAA 5 lb can	....	(3)	

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By Order of the Secretary of the Army:

HAROLD K. JOHNSON,
General, United States Army,
Chief of Staff.

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J. C. LAMBERT,
Major General, United States Army,
The Adjutant General.

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